WOOD WORKING digest

SEPTEMBER 1952

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A HITCHCOCK PUBLICATION

THE INDUSTRY'S *No. 1* PUBLICATION

in

- Editorial Content
- Advertising Volume
- Effective Circulation

PUBLISHED MONTHLY SINCE 1898

DRIVE STANDARD 12 GAUGE ROUND SASHPINS

AUTOMATICALLY!

The dependable, production-tested Spotpinner automatically drives—and countersinks to suit—the familiar round 12 gauge sashpin to produce quality millwork at substantially lower cost.

The new Spotpinner has a double capacity magazine contained entirely within its virtually indestructible molded frame.

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Write for new Spotpin circular today!

Spotpins are made in standard ⅞", 1" and 1⅛" sizes.

SPOTNAILS, INC. EVANSTON 1, ILL

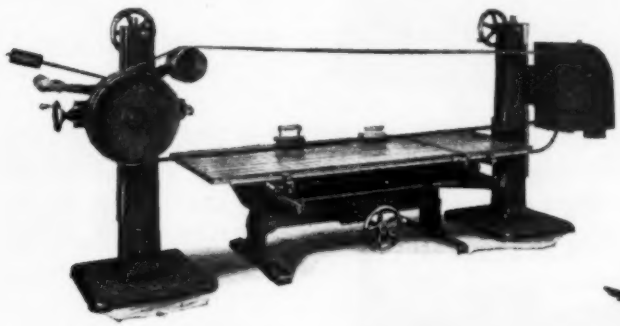
"OLIVER" BELT SANDERS

for finer finishing . . . in less time!

No. 185D HAND BLOCK MOULDING SANDER

Sands, polishes and finishes mouldings; straight, flat, irregular surfaces

It consists of driving unit, idler stand and table. Motor is fitted with aluminum pulley 7" wide, machined and rubber faced. Ball bearing idler shaft with adjustable yoke. Equipped with table 96" long, 32" wide that travels 33" horizontally. Table has sliding guide for clamping stock. Write for Bulletin No. 185D.



No. 183D REVERSIBLE BELT SANDER

An excellent Flat Sander . . . A fine Moulding Sander

With pulleys up, it's a Flat Sander; down, a Moulding Sander. Direction of belt travel reversed by safety switch. Sands flat, irregular surfaces and built-up pieces up to 44" high. Takes work of any practical length and sands to center of 66". Write for Bulletin No. 183D.

"Oliver" makes a wide line of Belt Sanders. Tell us your sanding problems; let our engineers recommend a paying solution.

OLIVER MACHINERY CO., GRAND RAPIDS 2, MICH.

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The strong-arm of the woodworker—that's Weldwood Plastic Resin Glue.

Because this wonderfully reliable glue actually makes wood joints stronger than the wood itself . . . binds them forever in a vise-like grip . . . ends the possible embarrassment of loosening joints . . . safeguards your reputation with your customers.

Weldwood Glue is a single-powder glue. It mixes quickly with water and requires but a few hours of pressure. It takes a little extra time to begin with but saves you time and trouble in the long run, because it is exceedingly strong—no delayed failures and its strength increases with age. Weldwood Glue is water-resistant, rot-proof, bacteria-proof, stain-free.

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because he protects your reputation for good gluing

-with

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PLASTIC RESIN GLUE

deservedly, America's Largest Selling wood glue

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For blond, pickled or tinted effects on all woods, use **WHITE FIRZITE**

To bring out and preserve the natural grain and beauty of any wood, use . . . . . **SATINLAC®**

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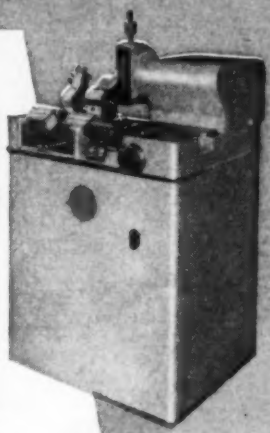
▸ **Profiler**

▸ **Grinder**

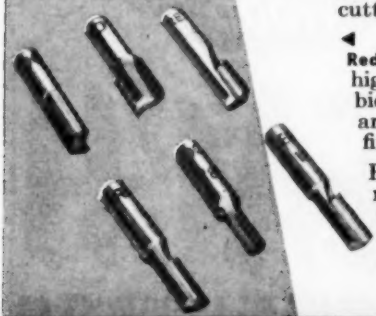
. . . a combination that builds PROFITS



Redco Precision Grinder and Profiler . . . simplifies the grinding of Redco Carbide Tipped Tools.

Redco Cutter Heads . . . true helical cutting angle of 6 carbide knives, speed and ease the work; 90% less tear-outs.

Redco Saws . . . dynamically balanced with oversize carbide tips; durable; low maintenance; fast, clean cutting.



Redco Router Bits . . . heavier, high frequency-welded carbide tips, cut easier and are longer lasting; give a finer finish to all work.

Every Redco product is made especially for woodworking plants to meet particular woodworking standards. *Write for complete catalog today.*

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A precision built machine for finishing plastics, metals or wood to extremely close tolerances. Speeds production and assures uniformly finished surface over entire sheet. Will feed material from 1/32 inch to 6 inches. Available in several sizes, ranging from 24 inches to 54 inches.

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SEPTEMBER, 1952 — OUR FIFTY-FOURTH YEAR

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The most dependable knife for general purpose high production work.

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MACHINE COMPANY
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Yes, let *air power* do your heavy work for you—let *air* do your pushing or pulling . . . lifting or lowering . . . opening or shutting.

Air is quick . . . convenient . . . and it will save you money. Try Schrader Air Cylinders to give you that push . . . or pull . . . or push *and* pull smoothly, quickly, for any distance from inches to feet . . . at forces from less than 20 pounds to over 5,000 pounds.

So whether it's for moving wood into a saw or for opening the door to a bin, let Schrader Air Cylinders do the job better.

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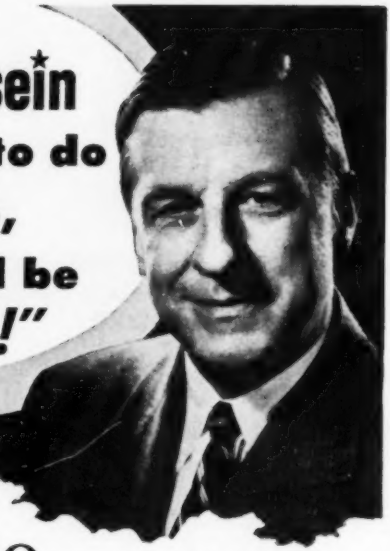

ONCE you've used the National Casein glue formula we tell you will do your job best — you, too, will agree with the customer quoted above.

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Try us once — "Casie," "Resie," "Phenie," "Fortie," or any other NATIONAL CASEIN adhesives. You'll stick with them because they *stick* for you.

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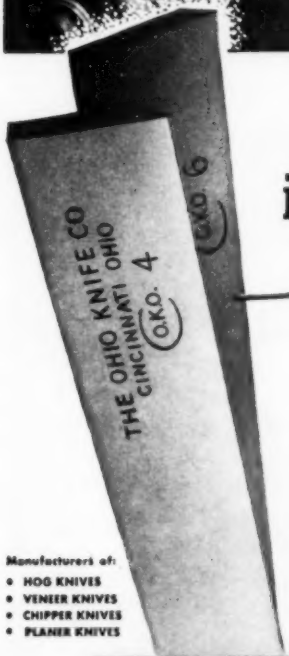
High production planing with OK Knives at Ferrin Lumber Co., Cincinnati, Ohio



it's OK let'er go!

and watch OK THIN HIGH SPEED PLANER KNIVES deliver perfect finishes on your toughest jobs.

These are the favorite knives of mills all over the world:

OK No. 4 is a special type of high speed steel designed to withstand the heat of fast, heavy feeds on rough, knotty, sandy lumber and still hold a keen edge on long runs.

OK No. 6—made of a specially developed chrome steel—is designed for mills working in soft, green wood.

Specify Ohio Knives and enjoy the superb performance that results in high production at a lower cost.

GO WITH OHIO GREEN

Manufacturers of:

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- VENEER KNIVES
- CHIPPER KNIVES
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THE OHIO KNIFE CO.

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Drexel Furniture Company, Drexel, N. C., attach their bed rail slat bearers with glue and Auto-Nailer.

SLAT BEARERS *attached* with NEW SPEED at LOWER COST.

GLUE and AUTO-NAILER* DO A PERFECT JOB..FASTER.

The Auto-Nailer is unequaled for attaching tight-jointed bed rail slat bearers . . . eliminates boring and screwing or glue clamps. AUTO-NAILER'S 1,000-POUND-SQUEEZE GLUE-NAILING LETS YOU CONTINUE PRODUCTION WHILE THE GLUE SETS.

Auto-Nailer makes, drives and countersinks 3-NAILS-A-SECOND. It is also great for such glue-nail jobs as banding tops and attaching cleats to panels . . . invisibly.

Let us show you what Auto-Nailer will do.

Williams Furniture Co., Sumter.

LIKE TO SEE SOME SAMPLES? Send us specimens of your work. We'll be happy to demonstrate Auto-Nailer's virtue and versatility, no obligation.

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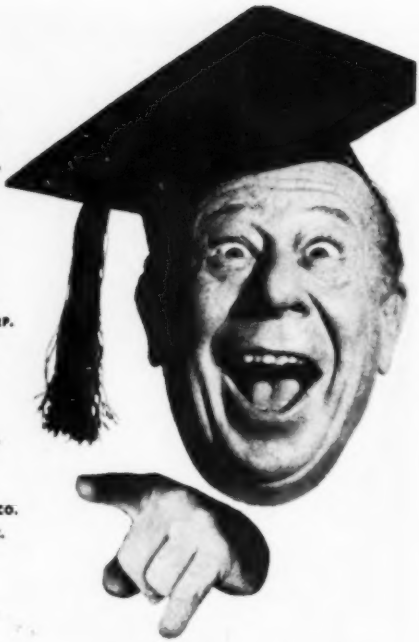
PRECISION BUSS PLANERS

Q.

Which of these 23 firms can reduce your costs—increase your sales?



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A. *All of them . . . because all of them make Phillips Cross-Recessed-Head Screws*

Your customers recognize these nationally advertised fasteners as the clue to quality. Millions of readers of The SATURDAY EVENING POST are being constantly reminded that "X marks the spot." So, they're looking for Phillips Screws on the products they buy. That means extra sales for you.

And that's not all. You save time, work, and money with Phillips Wood, Machine, Tapping Screws or "Sems." They save up to 50% driving time, set up tighter, reduce damage due to slippage. Use them more . . . and get more sales.

X marks the spot . . . the mark of extra quality

PHILLIPS *Cross-Recessed-Head* **SCREWS**

As Advertised in **POST**

THE FASTENERS OF TODAY . . . AND OF THE FUTURE

Real Savings for your Sawing Department from this *Whitney* 177 Variety Saw

You'll like this modern, precision Variety Saw designed and built by Whitney for handling all of your variety sawing. You'll like its versatility and ease of set-up for handling many and varied sawing jobs as well as straight production work. You'll like its ease of operation—its fine balance—its smooth running arbor. You'll like its capacity for high production and for accurate sawing. And you'll like its dependable performance and low upkeep cost. Install Whitney Variety Saws for better sawing at lowest cost.

Table, 53½" x 40" — Saw tilts to 45°
Cuts stock to 4" thick
Rips up to 29½" wide
Dado heads up to 3" wide
2 Quick-setting, easy-reading Cutoff Gages
5-position Rip Gage with micro adjustment at each position
Graduated Rip Scale built into table

Write today for full information. Ask for Saw Bulletin D-9.

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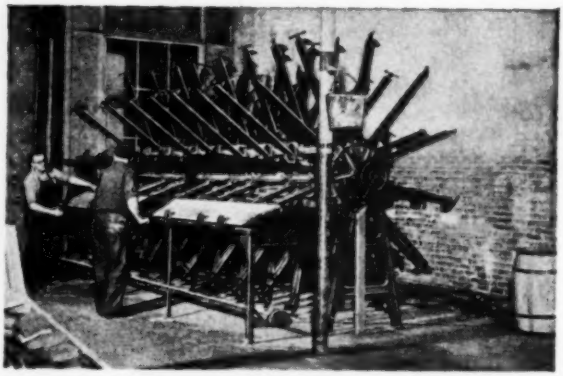
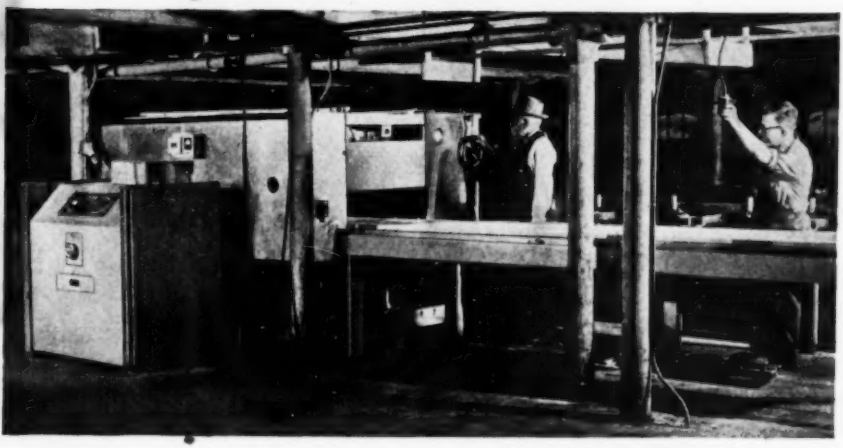
Westinghouse

Before

Two men worked 8 hours to turn out 120 soft pine spinning creel boards. Planing and finishing were delayed 24 hours. Gluing maple and birch press rolls also took 2 full-time men. Rejects were high.





After

Now, using a Westinghouse 10 KW RF Generator in the installation shown here, 2 men working only *part-time* do both gluing operations. Planing and finishing are done immediately after gluing. There are virtually no rejects at all.

.... THE *Before* AND *After* STORY

OF A $13,550.00 YEARLY SAVING!

For Saco-Lowell, manufacturer of fine textile machinery, the ancient glue wheel and hand clamps hardly approached the production-output and product-quality they desired. What finally led to annual savings of over $13,550? Westinghouse Dielectric Heating!

Now with RF Heating, gluing spinning creel boards and press rolls takes less than half the manpower, saves over 40,000 board-feet of lumber every year by elimination of rejects and salvage of formerly waste material, floor space is cut in half.

The annual savings of over $13,550 from labor and lumber more than paid for the installation in less than one year. And this does not include the added savings from production increases, less floor space, and improved quality!

Find out *today* how *your* plant can increase production and cut costs. Call your local Westinghouse representative for a free copy of our new booklet, *"RF Heating for the Woodworking Industry."* Or write Westinghouse Electric Corporation, Dept. W-21, 2519 Wilkens Avenue, Baltimore 3, Maryland.

Westinghouse

RF HEATING

J-02231

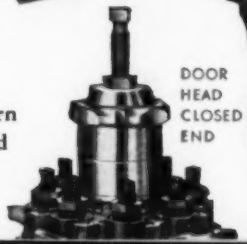
SASH and DOOR CUTTERHEADS

200 series

For . . . micro-lateral adjustment of bits, stronger head body, positive bit clamping, more bits in the cutting circle, longer bit usage . . . for a single cutterhead or a complete set-up, specify Yates-American "200 Series" heads.

Compare the "200" heads with those you are using. Compare them for cost. Consider a self-centering, modern cutterhead (with milled-to-pattern bits) at a price lower than that of the old square head with hand ground knives.

Cost no more than SQUARE HEADS with HAND GROUND KNIVES



DOOR HEAD CLOSED END

GROOVING DISC HEAD
DOUBLE DOOR COPE
DISC AND COPE HEAD FOR SASH RAILS
DOOR STICKING HEAD
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Yates-American
BELOIT, WISCONSIN
BRANCH OFFICES: CHICAGO, ILLINOIS; HIGH POINT, NORTH CAROLINA; MEMPHIS, TENNESSEE; PORTLAND, OREGON
MATCHERS
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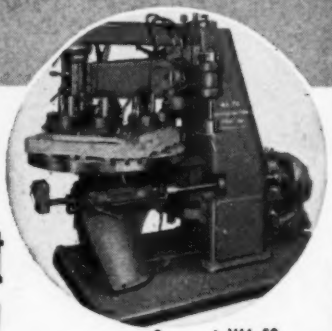
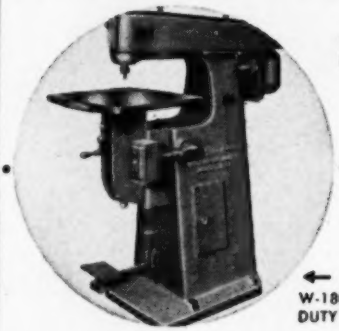
Onsrud®

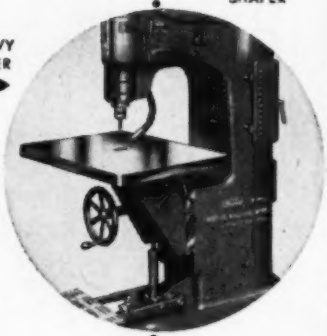
builds your output ...cuts your outlay!



WA-50 AUTOMATIC SHAPER



W-244 HEAVY DUTY ROUTER



W-180 MEDIUM DUTY ROUTER

It's no secret. Onsrud's world-famous high speed routers and shapers DO cut production costs — by the simple process of turning out more and better work in less time.

Whether you have highly specialized jobs, or straight run-of-the-shop work, there is an Onsrud machine that can handle it more quickly and easily for you. Whether the runs are long or short, the parts big or small, Onsrud builds your output . . . cuts your outlay!

ONSRUD MACHINE WORKS, INC.

3947 PALMER STREET • CHICAGO 47, ILLINOIS

We'll be glad to send you free literature on all Onsrud high speed woodworking machines, as well as delivery information on particular models.

Write or Call **TODAY!**

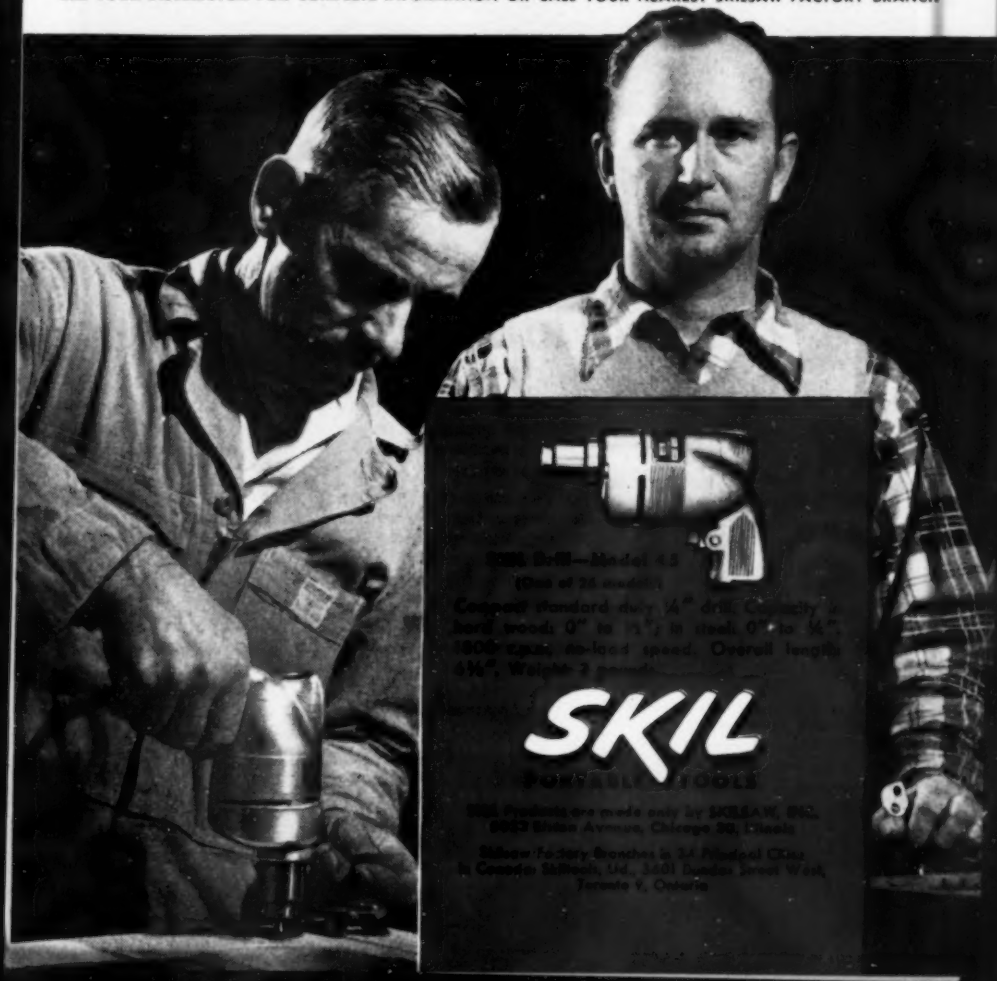
"We proved *SKIL* Drills out-perform, out-last all others!"

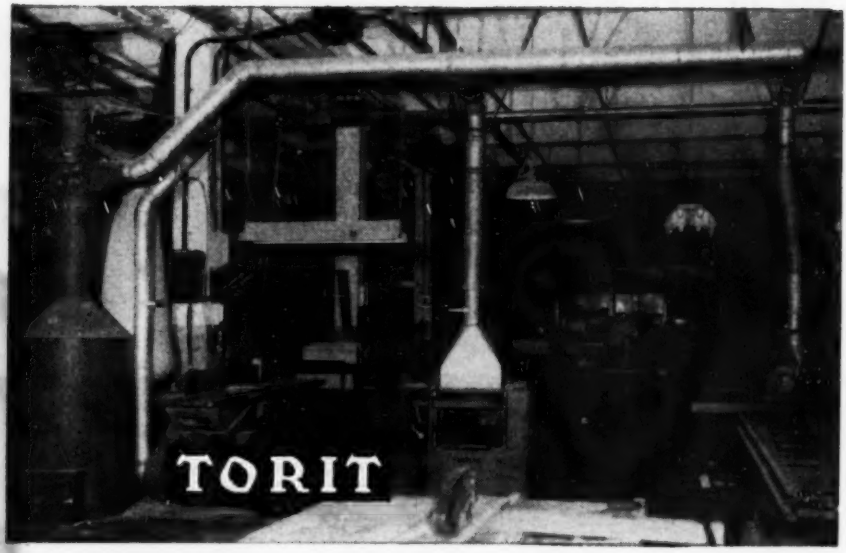
—says **L. M. Brinson,**
Production Coordinator
Lohman-Grimes, Inc.,
Winston-Salem, North Carolina

"We put SKIL Drills to the only test that counts—*production* work," says Mr. Brinson. "And we found by direct comparison they out-perform and out-wear any other brand we've used. In long, hard use, SKIL prove to be the most *durable* drills, no matter how much punishment we give them."

Lohman Grimes, Inc., a subsidiary of the Cotton Smith Furniture Manufacturers, has *standardized* on SKIL Drills because of this direct, competitive test on freedom from service and ability to do a better job on all drilling. In the operation illustrated, the assembly of a sewing machine cabinet, the Model 45 SKIL Drill is used thousands of times each day.

SEE YOUR DISTRIBUTOR FOR COMPLETE INFORMATION OR CALL YOUR NEAREST SKILSAW FACTORY BRANCH





It's Three to One

for a better dust-collecting job with this

TORIT DUST SEPARATOR

Torit Dust Collectors are also available in self-contained cabinet type units for carrying away dust-laden air around grinding, cutting and polishing wheels.

The jointer, the planer and the spindle shaper, all are connected to one No. 19-FB Torit Dust Separator. One at a time, or even with two machines operating, this unit collects the dust efficiently.

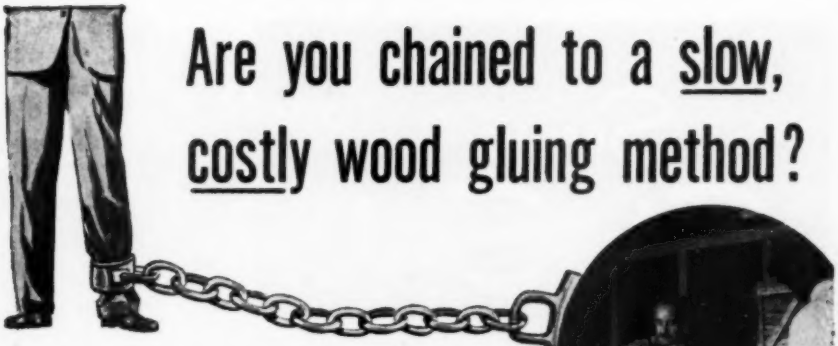
No extensive piping is necessary with Torit dust collecting equipment. They can be wired through machine starting switches to operate simultaneously, and they clean the air so thoroughly that outside exhausts are unnecessary.

Note, too, the 15 cubic foot capacity of the storage reservoir of the unit above. Made especially for this service is shows the adaptability of Torit dust collecting equipment to every situation where dust creates a problem.

For complete information on how to solve your dust problems, and the latest Torit catalog, write:

TORIT MANUFACTURING CO.

294 Walnut Street St. Paul 2, Minn.



Are you chained to a slow, costly wood gluing method?

Thermatron

HIGH FREQUENCY GENERATORS AND EQUIPMENT

. . . For Permanent Wood Bonding in a Matter of Seconds!

Seen in the jig is an entire cabinet assembly to be glue-set electronically by THERMATRON in only 30 seconds. The bond is stronger than the wood itself by actual test! Hidden in the background is the 3 KW generator which masterminds this job.

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The saving to you in time, labor, floor space and expensive veneers is immeasurable . . . And the bonds produced are stronger than the wood itself. Costly clamps and clamping time are eliminated, and there are far less rejects.

THERMATRON supplies the complete installation, including generators and jigs, under one contract and one responsibility. The immediate production savings THERMATRON brings you are often more than the initial installation cost.

Write us today for complete details about your bonding problem . . . We'll be glad to offer guidance without obligation. And ask us for our instructive bulletin No. WD-18

HIGH FREQUENCY GENERATORS AND EQUIPMENT FOR ELECTRONIC GLUE DRYING • BENDING • EDGE GLUING • VENEER BONDING

Standard stock generators available from 500 Watt to 20 KW output, operating on 110 or 220 volt lines. Larger size generators up to 100 KW can be supplied for larger requirements.

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YOUR TYPE—YOUR SIZE—YOUR SPEED

Specify Silver Steel®

CALL YOUR ATKINS DISTRIBUTOR

Fast, complete saw service is as near as your phone. Depend on Atkins *Silver Steel* for all cutting, shaping, trimming, planing—and for cutting costs.

SOLID TOOTH CIRCULAR SAWS—Flat or Hollow Ground

Ask for Atkins solid tooth circular saws . . . to save time on every cut . . . to save money on every blade . . . to get the kind of accuracy that cuts your finishing work. Whatever your woodworking requirements, depend on Atkins for the right saw.

A-2 RIP—Cuts fast and doesn't wobble. Holds a keen cutting edge—stays longer on the job.

A-8 CUT-OFF—For smooth cutting across the grain at maximum speed. Long-lasting edge stands up under heaviest use.

A-44 COMBINATION—Flat ground, rips or crosscuts equally well, fast, true. Holds cutting edge.

A-37-H HOLLOW GROUND MITRE—Rips, crosscuts or mitres smoothly. Saws fast without heating up—requires fewer sharpenings.

SILVER STEEL NARROW BANDSAWS—Uniform high quality; properly heat-treated to meet the demand for tough bandsaw blades with teeth that stay sharp.

SILVER STEEL MACHINE KNIVES—Accurate, precision cuts, fast cuts, for a longer time. Perfectly balanced knives packaged in sets.

SILVER STEEL SMOOTH-END TRIMMERS—Fast sawing, clean cutting—maximum clearance. For power or hand feed, green or dry lumber.

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permanently laminated with Penacolite® Adhesives . . .

permanent in spite of rough seas, extreme weather and salt water corrosion

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Since they cure without the aid of strong acid catalysts, neutral Penacolite Adhesives are ideal for bonding cellulosic materials.

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® *The original waterproof, room-temperature setting adhesives*

WE HAVE *Failed* AFTER 75 YEARS
TO SOLVE ALL NAILING PROBLEMS

But THOUSANDS OF PROBLEMS PREVIOUSLY CONSIDERED IMPOSSIBLE HAVE BEEN SOLVED BY . . . . . .

DOIG AUTOMATIC NAILERS

DOIG NO. 45-20-16

NEW FEATURES

A. Wheel on left allows operator to adjust back gage from operating position.

B. Solenoid trip permits operator to trip machine at any position desired.

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STANDARD DOIG FEATURES

1. Anti-friction bearings
2. Three separate motorized drives
3. Nail feeder to handle nails from 1 to 3 inches without additional parts required.
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WRITE TODAY . . . we invite your requests for full details

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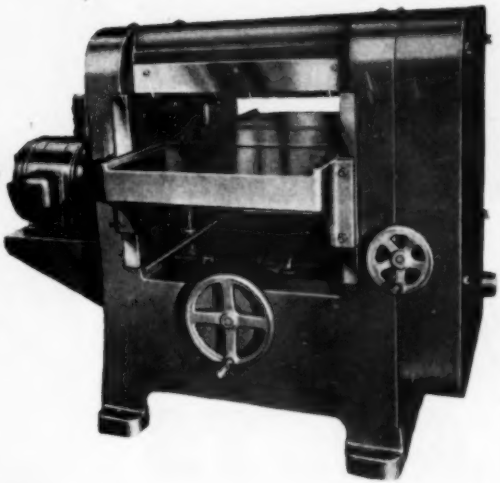
You Asked For It!

HERE IT IS



The
ALL Cast Iron POWERMATIC MODEL 220 20" PLANER

Compare These Features . . .

AN EXTRA HEAVY DUTY SINGLE SURFACER, PRECISION BUILT FOR LIFETIME SERVICE

SECTIONAL CHIPBREAKER .Safety type, mounted in springs on solid bar concentric with cutterhead.

SECTIONAL FEED ROLL . . . Machined Sectional Rolls. Sections mounted in springs. Adjustable.

VARIABLE SPEED . . . . . . Variable speed pulley for slow and fast operation. FORWARD and Reverse throttle lever.

CUTTERHEAD AND ROLLERS MOUNTED IN SEALED FOR LIFE BALL BEARINGS

INDIVIDUAL 1 Horsepower FEED ROLLER DRIVE

Powermatic Machine Co.

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Please send me free literature on the 220-20" Planer.

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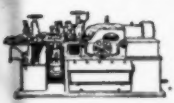
You, too,* can CUT COSTS with DIEHL Moulders



For over 40 years, Diehl-Vonnegut Moulders have set the standard for the industry—providing long, trouble-free performance at highest production speeds with negligible maintenance cost.

You, too, can cut costs—by standardizing on world-famous Diehl-Vonnegut Moulders as well as other Diehl woodworking machinery . . . profit by engineered design simplicity, ease of set-up, ease of operation, precision construction, and *dependable Diehl service.*

Diehl-Vonnegut Moulders include standard 4-head models in 4″, 6″, 8″ and 12″ sizes, and special 5-head models in 8″ and 12″ sizes.

Call your Diehl representative or write today for descriptive literature.

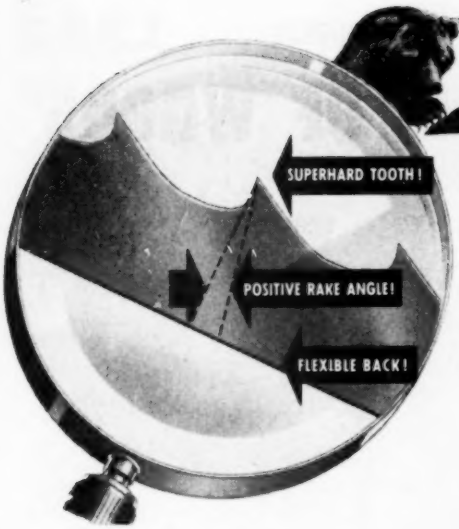
***For Example:** Pair of Diehl-Vonnegut Moulders cut costs—maintain fast and accurate production—for S. R. Hungerford Company, Inc., Memphis, Tenn., makers of solid mahogany furniture. Hungerford also uses Diehl Rip and Cut-Off Saws.

Where Precision Craftsmanship is Honored

On the Banks of the Wabash

THE G.M. Diehl MACHINE WORKS, INC.

WABASH, INDIANA • U.S.A.



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DoALL CLAW TOOTH SAW BAND...

Widths from ¼" to 1½". 2, 3, 4 and 6 pitch, depending on width.

FOR ALL BAND SAWS . . .
EXTRA FAST CUTTING, EXTRA LONG LIFE

NOW, for the first time, in the DoALL Claw Tooth saw band, mass production of a blade combining a *positive rake angle, hardened teeth* and a *flexible back* has been achieved.

Faster, free cutting with less feed pressure results from the hooked, claw-like teeth which actually "pull" into the material being sawed.

The superhard teeth give longer blade life with substantially higher cutting efficiency up to time of replacement than that of non-hardened blades which must be resharpened periodically.

The result is a blade that industry has been waiting for—a blade that reduces bandsawing costs and increases production when properly applied.

Eliminates Resharpening and Resetting — it's cheaper to replace long-lived Claw Tooth blades than to use blades which must be resharpened a number of times during their life.

Increases Production—more output per machine and manhour because of faster cutting and elimination of blade removal for resharpening.

Cuts Costs—higher production and elimination of blade maintenance labor and equipment means lower bandsawing costs.

Ask for Literature

Complete information, prices, specifications available upon request. Call your local DoALL Sales-Service Store or write:

THE DoALL COMPANY
254 N. Laurel Ave., Des Plaines, Ill.

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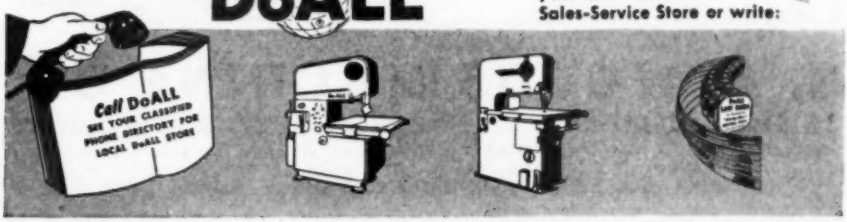
DoALL



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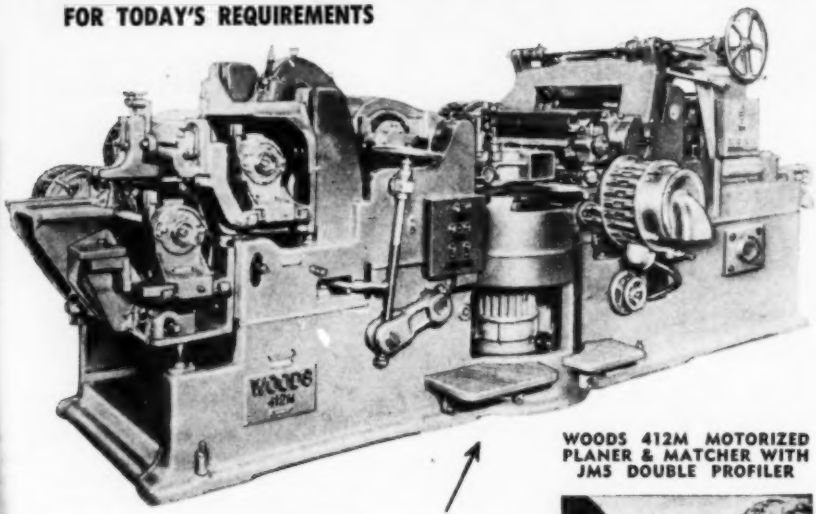
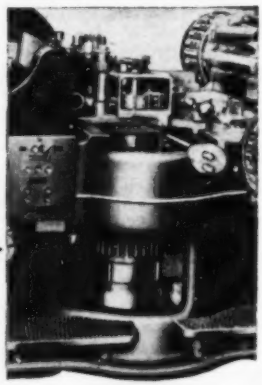
"THE PLANERS OF WOODS"

FOR TODAY'S REQUIREMENTS



WOODS 412M MOTORIZED PLANER & MATCHER WITH JM5 DOUBLE PROFILER

- Continuous frame construction with bulge at sidehead units for frame rigidity and positive sidehead clamping.
- Woods 412M Series designed to meet present-day requirements, more production and better finished quality, lower operating cost, less maintenance and less down time.
- Large range of power using Woods fully taped insulated built-in motors.
- Write for full particulars.



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12 Damrell Street **Boston 27, Massachusetts**

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RICHMOND, VA. • NEW YORK, N. Y.
CANADIAN W. A. AKHURST MACHINERY COMPANY • VANCOUVER, B. C.

BIG capacity—
BIG value—
THIS
DELTA
20" Band Saw

- **Big table—20⅜" wide, 24¼" long —tilts 45° to right, 12° to left.**
- **Adjustable 3-point mountings assure exact alignment of table and wheels.**
- **Balanced wheels mounted in sealed-for-life ball bearings.**
- **Blade guides fully adjustable, to micrometer precision—easy to get at, safe, accurate.**

also—DELTA 14" BAND SAW

Experienced woodshop-men respect this versatile Delta saw for its speed, accuracy and economy—for the traditional quality built into Delta's famous "Big 5" woodworking tools: the Delta band saws, radial saws, planers, jointers and tilting arbor saws. *Send for the Delta AB-51 Catalog—use the coupon.*

There's a Delta Power Tool for Your Job-

53 MACHINES • 246 MODELS
MORE THAN 1300 ACCESSORIES

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DELTA MILWAUKEE **DELTA POWER TOOL DIVISION**

Rockwell MANUFACTURING COMPANY

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☐ Please send me newest Delta AB-51 catalog.
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Step on it for more production

PORTER 43-20J Automatic Hydracut Saw

FOOT PEDAL CONTROL ENDS OPERATOR FATIGUE

Increase lumber production in your plant with these Hydracut Saw set-ups.

1.

Standard Set-up. Hydracut Saw and tables.

2.

Hydracut Saw in single line conveyorized rough mill set-up.

3.

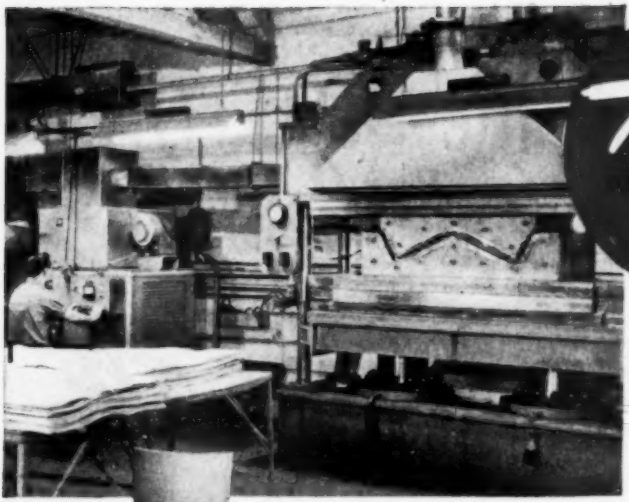
Hydracut Saws in double line conveyorized rough mill set-up.

The Porter 43-20J Automatic Hydracut Saw saves hours of labor . . . enables any cutting room operator, regardless of age, to cut more lumber per day by eliminating tiring hand operation. Operator simply positions the lumber against the adjustable cut-off stops . . . and presses the electrically operated foot control. The saw blade, mounted on a hydraulically operated carriage, *automatically* moves forward to make the cut and *automatically* returns. Fatigue from manual "push-pull" operation is gone.

Stroke length is quickly adjusted by a convenient lever. Cutting speeds range from 0 to 45 cuts per minute.

The new Porter Bulletin 43-20J-1 fully explains the Automatic Hydracut Saw. ***Send for your copy today.***

C. O. PORTER Machinery Co.
668 Front Ave., N.W., Grand Rapids 4, Mich.



Thermex

ELECTRONIC BONDING EQUIPMENT

THERMEX ELECTRONIC BONDING EQUIPMENT FOR:

EDGE-BONDING OF LUMBER
MOLDING OF LAMINATED PARTS
BONDING PANELS-TO-FRAMES
FABRICATION OF ASSEMBLIES
BONDING OF PLYWOOD

Eliminates expensive dies on short production runs

AT PLY CURVES, INC., THERMEX® Bonding Equipment permits real economy on short production runs . . . where conventional equipment would be prohibitively expensive.

Dies are made of wood and overlaid with copper electrodes . . . thus their cost is far less and they can be produced much faster than all-metal dies. And once dies and stock are placed in the electronic press, assemblies are bonded and cured in a few minutes time. The complete installation requires only about one-fourth the floor space required by conventional equipment.

THERMEX users everywhere report faster, more economical production and reduced labor requirements. A THERMEX field engineer will be glad to study your operations and make recommendations—at no obligation. Write The Girdler Corporation, Thermex Division, Louisville 1, Kentucky.

The GIRDLER Corporation

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The Best "Tip" of the Year!

CARBIDE TIP

NEW DESIGN
SAW BLADE

TYPICAL PRICES

Diameter	Teeth	Price
12"	60	$149.50
14"	60	$153.50
16"	60	$157.50

World's most satisfactory blade for smooth splinter and chip free finished. Especially designed for trimming, mitering and cross cutting fancy veneered panels, ply woods, decorative laminates and solid woods.

Expenses are clipped when it's Big Four Carbide tipped.

BIG 4 SAFETY
SAW BLADE

TYPICAL PRICES

Diameter	Teeth	Price
5⅞"	6	$14.40
8"	10	$18.60
10"	10	$24.30
12"	12	$31.00
14"	14	$34.20

Revolutionary in design, performance and PRICE. Anti-kickback features mean less operating effort; carbide tips give longer life. Blades for all sawing operations available 5⅞" to 16" diameters. For portable electric, hand- or chain-fed machines.

"Ask your local dealer—if he is unable to supply you, contact us directly."

Big 4 produces saw blades for every purpose, from school room manual training to large industrial projects.

BIG FOUR CARBIDE TOOL COMPANY

5938 CARTHAGE AVENUE • CINCINNATI 12, OHIO

For free comprehensive booklet write to: Big Four Carbide Tool Co., 5938 Carthage Avenue, Cincinnati 12, Ohio.

Comments from THE NATION'S CAPITAL

By Arnold Kruckman
Washington Correspondent

Wood manufacturers in the two most recent weeks of August received in the neighborhood of $3 million worth of contracts from the Navy, Army, Air Force, General Services Administration, District of Columbia government, and the Veterans' Administration. Navy was the biggest buyer with an order for a half a million dollars worth of pallets; Army came next with $400,000 worth of chairs. The Air Force bought $157,000 worth of plywood chests; the various purchasers procured in excess of a million dollars worth of furniture.

The list of supplies purchased included shoe lasts, desks, storage bins, upholstered lounges, furniture, pallets, chairs, desk trays, boxes and wood cabinets.

Defense Production Administration asked $50 million expansion in facilities for lumber and wood products not later than January 1, 1955. Rapid tax amortization was emphasized. DPA divided expansion program thus: laminating, $3 million; hardboard plants, $6 million; dry kiln, $2 million; lumber and storing and handling, $1 million; debarkers and chippers, $3 million; fibre, chip and miscellaneous waste products, $9 million; wood preservation, $1.5 million; other wood products, $2.5 million; sawmills and related facilities, $20 million. Conservation projects will receive favor for amortization certificates of necessity.

NPA has removed inventory controls from more than 50 widely-varied commodities, including forest products. However, there are still inventory controls on such items as lumber, plywood, wood poles and piles. There are no controls in the lumber category on railway crossties, mine ties and hardwood flooring.

GIs returning from Korea are entitled to re-employment rights and benefits similar to World War II veterans. Singularly enough, these do not stem from recent legislation, as generally assumed, but were provided in the Universal Military Training

and Service Act of 1951 and earlier legislation. These laws cover all persons entering the military service since World War II in protection of their job rights.

General Order 17, continuing wage and salary stabilization controls for nine classes of small business enterprises—eight employees or less—effective August, 1952, included logging operations or operation of sawmills or planing mills, and enterprises in the building and construction industry.

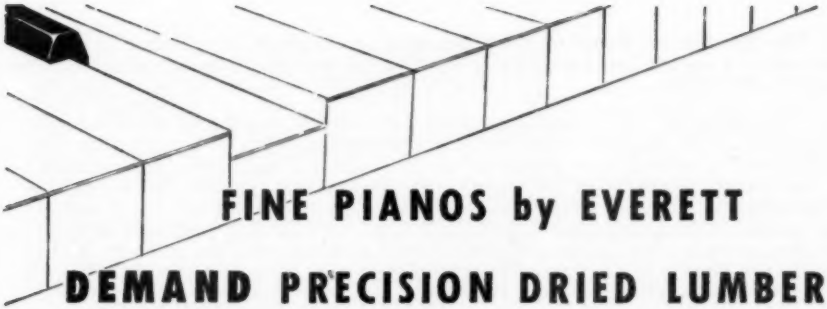
Except for the nine non-exempt classes, any enterprise employing a total of eight or less persons in all branches or units shall continue exempt from controls until total employment exceeds fifteen persons, when the enterprise comes under controls.

Bureau of Labor Statistics says that the settlement of the steel labor disputes immediately resulted in increased employment in the lumber industry.

A recommended revision of standard stock Ponderosa pine windows, sash, and screens, commercial standard CS163-49, has been circulated by the Commodity Standards Division, Office of Industry and Commerce, to manufacturers, distributors and users for their consideration and written acceptance. This revision was proposed by the National Woodwork Manufacturers Association. The purpose is to establish specifications for standard sizes, layouts and construction of stock windows, sash and screens, to guide producers, distributors, architects, builders and others interested, and to provide the building industry with standard wood windows, sash and screen, built on a four-inch module or increment. Limited number of mimeographed copies of the recommended revision, TS-5143, are available, and may be obtained from the Commodity Standards Division, Office of Industry and Commerce, U. S. Department of Commerce, Washington 25, D. C.

Proposed revision of "American Lumber Standards for Softwood Lumber," simplified practice recommendation R16-39, has been circulated by the Commodity Standards Division to manufacturers, distributors and users for consideration and acceptance. This recommendation, originally issued in 1924, covers the basic standards used for the grading, measurement and inspection of softwood lumber. It has been necessary to previously revise these standards five times to keep abreast of conditions and improvements in lumber standardization and simplification. Copy of the revisions may be obtained from the Commodity Standards Division, Office of Industry and Commerce, U. S. Department of Commerce, Washington 25, D.C.

Small manufacturing establishments doing not more than $25,000 business annually have been exempted from price control by OPS. Exemption applies to manufacturers making products under GCPR, and the manufacturers' General Ceiling Price Regulation 22. Exemption was made in Amendment 33 to GCPR, and Amendment 54 to CPR 22, effective August 20, 1952. Exemption specifically affects manufacturers of wooden ware, brooms, brushes, cabinet work, and numerous other items made in small or part time establishments. Action was taken to relieve small manufacturers



FINE PIANOS by EVERETT

DEMAND PRECISION DRIED LUMBER

Everett Piano Company's new lumber storage facilities and automatically controlled Sipho-Fan dry kilns by Imrie

Imrie Sipho-Fan dry kilns have set the pace in precision drying of lumber for the past 20 years

OUR PURPOSE . . . TO SERVE YOU BETTER

SIMPLICITY ECONOMY

Imrie Dry Kiln Company

MICHIGAN TRUST BLDG.

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of the burden of keeping records and otherwise complying with the specified price regulations, and to reduce the administrative burden for OPS.

Producers' ceiling prices on untreated Southern pine cross ties sold for export have been suspended by OPS. Suspension is designed to encourage production of ties to be used in building a railroad, some 90 miles long, in Venezuela, to serve recently discovered iron ore deposits. Prompt development of this ore is considered important to the defense program. Because of the porous grain, Southern pine ties are preferred for the new railroad, as they, when treated with preservatives, are highly effective against rot and insects.

Various minor changes in methods of pricing fir and hemlock lumber are specified in Amendment 1 to CPR 128, effective August 13, 1952. They are intended to apply the regulation to industry practices, correct omissions and errors, and clarify certain provisions.

Proposals that OPS consider tailored regulations for the industry were made by a delegation of hardwood lumber distributors. The distributors want a regulation patterned after the old wartime regulation NPR 467 issued by OPA. Industry said it is difficult for hardwood lumber distributors to price under SR-87, GCPR. GCPR ceilings would be inadequate if manufacturers' prices should rise and remain firm at manufacturers' ceiling.

Established weights for green hardwood and yellow cypress lumber cut in the Southern and Appalachian hardwood lumber regions were announced by OPS, in Amendments to CPR 132, and CPR 151, effective August 2, 1952. Originally the regulations established weights for air-dried lumber but not for green lumber.

Redwood lumber industry is concentrated in Northern California. In 1951 it produced about one billion board feet of lumber valued at $105 million. The lumber is light and strong. It is in demand for use as mud sills, siding, tank stock and for other purposes where high resistance to insect attack, weather and moisture conditions are important. Because of the enormous size of redwood trees, large mill equipment is required. The lumber must be dried with exceptional care for a long period.

OPS cuts personnel from 12,000 to 6,000 during September, and also greatly reduces its program and work by reason of the Congressional amendments. All controls are weakened and decreased. It is generally assumed in Washington that consumer products will gradually ease out of controls. OPS officials are canvassing far and wide to find jobs for the 6,000 more or less expert employees they must discharge.

To force further national industrial dispersions, DPA requires applicants who request an extension of time for rapid tax write-off certificates of necessity, to attach a statement containing the recommendation of their local dispersion groups or, at least, a map showing the plant location in relation to their industrial areas. More than 60 local dispersion groups, or

Have YOU Considered These Extra Profit Possibilities?

A FEW PROFITABLE USES FOR WASTE WOOD

AS WOOD FLOUR FOR:

- Linoleum filler
- Plastics filler
- Composition flooring
- Artificial wood
- Molded products
- Insulating brick
- Glue extender
- Granulated soap

—and many other specialized products

AS SAWDUST FOR:

- Hardboard
- Insulating wallboard
- Soundproofing board
- Gypsum compositions
- Animal bedding
- Absorbent products
- Metal cleaning, drying and polishing
- Packing material
- Leather manufacturing
- Fur conditioning
- Stucco and Plaster

ALSO for various types of papers used for many purposes

Perhaps you are already making money from waste wood, in addition to burning it as cheap fuel. But have you explored ALL the possibilities suggested by the list at the left?

In any of the uses for which you may sell your waste, most important is its proper reduction and preparation. Efficient, low-cost handling — consistent uniformity — minimum equipment investment — economical power requirements and maintenance — all are factors that can mean the difference between profit and loss.

These are the things with which Williams can help you! Many years of experience in designing equipment especially for profitably hogging, grinding, sizing and handling of wood waste are at your service without obligation.

Let's Discuss It!
WRITE TODAY

No. 50 "S Type" No-Nife Hog. Note rugged construction typical of all Williams equipment.

WILLIAMS COMPLETE LINE INCLUDES

- Hogging, Grinding & Shredding machines of all types
- Vibrating Screens
- Air & Mechanical Separators
- Complete "Packaged" Plants
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WILLIAMS PATENT CRUSHER & PULVERIZER CO.
808 ST. LOUIS AVE. ST. LOUIS 6, MO.

WILLIAMS

CRUSHERS GRINDERS SHREDDERS

OLDEST AND LARGEST MANUFACTURER OF HAMMER MILLS IN THE WORLD

organizations, already have been set up throughout the United States. There are seven principles of dispersion, including one that industrial development areas should be 10-20 miles away from any densely populated or highly industrialized section.

Lumber production in the United States during 1950 is estimated by Census at 38.0 billion board feet, lumber tally, as compared with 32.1 billion board feet in 1949, and 35.4 billion board feet in 1947. Production in eastern states, which had dropped by 18% between 1947 and 1949, again reached the 1947 level. Western production, showing almost no change between 1947-1949, increased by about 13%.

Softwood production, at 30.6 billion board feet, was 16% above 1949; and hardwood production, at 7.4 billion board feet, increased by 29%.

National Lumber Manufacturers Association in Washington announces that "100 Years of Engineering Progress with Wood" will be the subject of the discussions in Chicago as part of the celebration of the 100th Anniversary of the American Society of Civil Engineers, September 3-13. It is expected that 55 national engineering societies, representing about 380,000 engineers, will join in large numbers in the discussions.

Resistance to atomic blast can be built into new multistory buildings for an average additional construction cost of only about 3%, according to Federal Civil Defense Administration.

Timber cut from national forests totaled 4,418,517,000 board feet during the year ending June 30, 1952, reports the Department of Agriculture. This is 270,000,000 board feet less than was cut in 1951. The drop is due primarily to the severe winter and late spring, says the United States Forest Service. Deep snows halted operations in the Pacific Northwest and in California. These are the heavy lumber-producing regions of the country.

More than 17,000 research projects on wood and other forest products, conducted by nearly 3000 domestic and foreign organizations, firms and agencies, are catalogued in the new fifth edition of the "Forest Products Research Guide," available in September from the National Lumber Manufacturers' Association in Washington, D. C.

Veneer production by hardwood veneer and plywood manufacturers amounted to 2,550,000 square feet, surface measure, during the first quarter of 1952, according to Census.

Defense Transport Administration secured from the Interstate Commerce Commission service order No. 889 calling for a minimum weight to be observed in initial loading of cars destined to be stopped off to complete loading of lumber. The action was necessary to meet railroad car shortages in the Pacific Northwest. Navy recently gave the New York Society for the Blind an order for $11,000 worth of wood-handled brooms.

Marine sources report to the Department of Commerce a surprising upturn in shipment of lumber to the West Coast.

FAY & EGAN

First choice of master craftsmen for over 120 years

FAY & EGAN

511

Fay & Egan Universal Tilting Arbor Saw

Heavy Duty Capacity: 16" diameter saw cuts stock 4" thick; cuts through 3½" when motorized arbor is tilted to maximum 45°. Rips material up to 24" wide. Takes blades up to 18" diameter for cutting stock 5⅛" thick.

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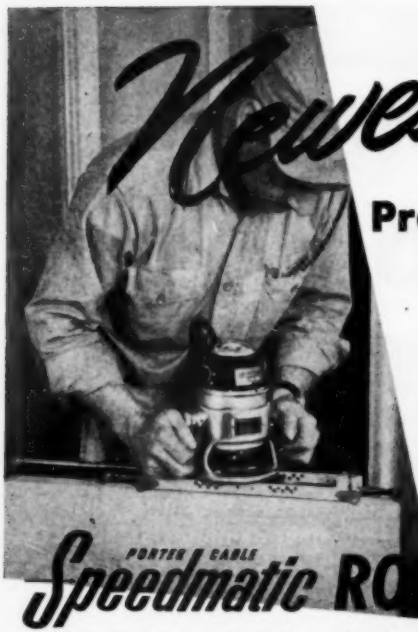

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Trade Associations
AND THE
Woodworking Industry

In preparation for our Annual Directory Issue — to be published next month — we have contacted many of the woodworking trade associations. Letters from the various groups have outlined their plans and purposes, stating clearly exactly what each association can do and is doing for its members. It has been interesting to us to watch membership gain in the various associations — proof that the critical attitude which existed some several years ago is gradually disappearing as these organizations continue to make real advances for the woodworking industry.

Here are some of the more important accomplishments which we have seen: promoting efficiency in production and distribution through technical research; development of high standards of business conduct; working for the elimination of unfair competitive practices; carrying on activities to increase sales by expanding markets; creating good will and better understanding; establishing standards for manufacturing specific products; aiding in the development of new products and new uses for old products; providing public representation.

Some of these accomplishments are obvious to all of us. Research is an example. How many of you in the woodworking industry are making products that were unheard of 10, 15 or 20 years ago? Another important advantage in belonging to a trade association is the united action it can give to any group. During the last couple of years, trade associations have been giving more and more thought to holding our markets, reclaiming those markets which we have lost but which rightfully belong to the woodworking industry, and developing new markets.

Member cooperation and participation in its activities is the life blood of any trade association. Right now many of the associations should be strengthened by new members. The best and oftentimes the only source of accurate specialized information for a particular phase of the woodworking industry is concentrated in its trade associations. This applies not only to the records and printed material, but to the knowledge and experience of its members and officers. This knowledge practically applied means advance for the woodworking industry. Specifically, it means advancement for you in your own particular business.

Look over next month's listings of associations, their purposes and objectives, then investigate for yourself those which can help you in your particular phase of the woodworking industry.

NED BAILEY
Editor in Chief

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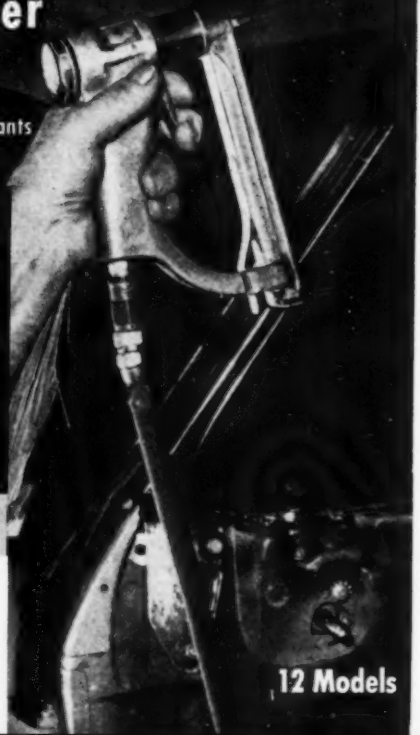

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Last month our "Know Your Wood" article featured black cherry. Among other things, we mentioned its growing popularity. Figures just reaching us indicate that cherry shipments are the highest since January. June shipments went beyond June production and there seems to be no reduction in the demand. Question, "Is there anything being done to replenish the supply of black cherry?"

Four million handles a year are produced by the Bruner-Ivory Handle Co., Hope, Ark. This firm makes 500 types of hickory handles and some 60 types of ash handles—quite a variety and quite a number of handles. Guy E. Basye, general manager, has proved that by making a better handle he'll have a path worn to his door. He says that he makes them as good as he can—"from the best wood, with the best modern machinery and with quantity production methods."

More than a million acres of Tree Farms have been certified in the South during the first seven months of this year. This brings the total to 1,145,899 to surpass the 1951 mark by more than 100,000 acres, we are told by the Southern Pine Association.

I have often wondered where the varnish came from that was used to help preserve wood products and mummies that are found in the tombs of the ancient Egyptians. This may be the answer, in 1000 B.C., the natives of Asia manufactured pitches and oils from the gum or resin of trees which grew on the shores of the Mediterranean Sea. The gum was cooked in pots, over which were hung fleecy sheepskins to catch the rising vapors of oil distilled out of the resin. This oil was recovered by wringing out the fleeces. One of the uses of this oil was that of a solvent for the age-enduring mummy varnish.

Full impact of the steel strike on the woodworking equipment industry will not be felt for sometime, members of the Lumber, Veneer and

Plywood Machinery Manufacturers and the Woodworking Machinery Manufacturers Industry Advisory Committee said recently in a meeting with the National Production Authority.

From the "Defense Production Record" we learn that an expansion goal for lumber and wood products has been set at $50 million in new facilities and equipment to be completed by Jan. 1, 1955, and the production goal for exterior type softwood plywood has been set at an annual rate of 1.15 billion square feet of 3/8" basis, by Jan. 1, 1956.

For those who have not seen the modern trailer camps of Florida and California it will probably come as a surprise to know that more than 1,700,000 Americans now live in mobile homes. We are reliably informed by the Trailer Coach Association that the trailer population is increasing at the rate of about 200,000 a year. The most remarkable part is that 90% of the trailers are used for permanent homes. There are about 12,000 trailer parks in the country. Many of them are complete with laundries, playgrounds and swimming pools.

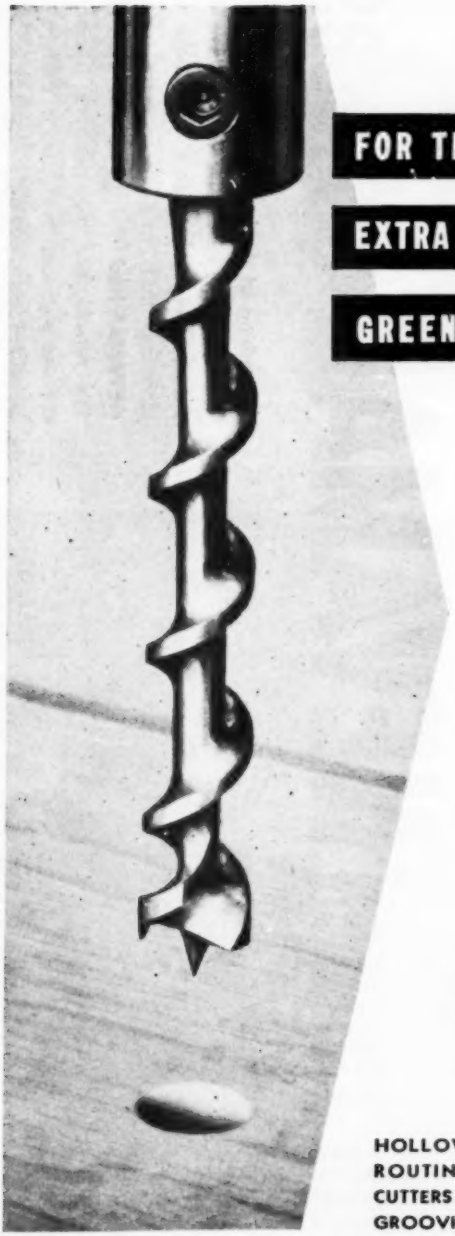
We hope all of our readers will note the first chapter of a series on electronic gluing which appears in this issue. This article is the result of intensive research and hundreds of contacts. We believe it will be one of the most outstanding articles that we have ever published.

Talking to a paint salesman recently we were informed about several things—some of which have already appeared in these columns. This man really knew paints, their history and uses. He told us that one of the most frequent reasons why paints did not fulfill the user's requirement was that the user did not read instructions before using. Two or three minutes spent reading the label on a paint can may make the difference between a satisfactory paint job and an unsatisfactory one. Naturally the manufacturer wants you to get good results, so he gives you all the help he can.

Lifting of price controls on true mahogany logs and lumber imported into this country covers primarily shipments from Africa, Mexico, Central and South America. The group of woods being marketed as Philippine mahogany still remains under controls.

Regional summer markets followed the pattern set at Chicago. Dealers partook cautiously of the generally excellent values offered. Post-market business shows promise—retailers looking forward to a good second half find that their expectations are bolstered by the business pick-up of the last couple of months.

National Hardwood Lumber Association has provided instruction in hardwood lumber techniques to more than 200 men since the first of the year. Courses cover grading, measurement, the manufacture and sale of all hardwoods.



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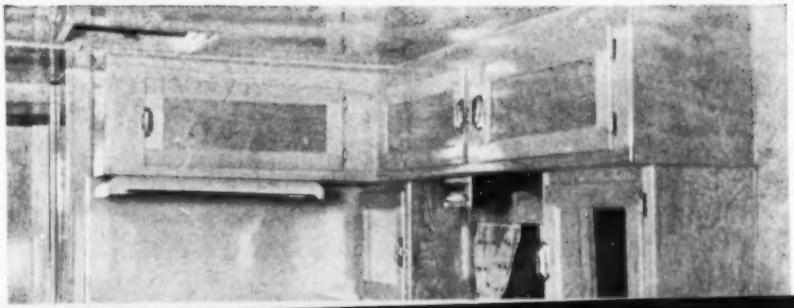

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ELECTRONIC GLUING

A Survey of equipment applications

Part 1—Generators

By Paul H. Graham

THIS SURVEY of electronic gluing equipment types and uses in woodworking plants throughout the country almost died at birth. The very first contact made brought forth this comment: "The subject of electronic gluing is a rather delicate one. In some plants it seems to work; in others it doesn't. Also, there is always the possibility of interference. We wouldn't advise going overboard to concentrate on it because it is certainly a hot potato."

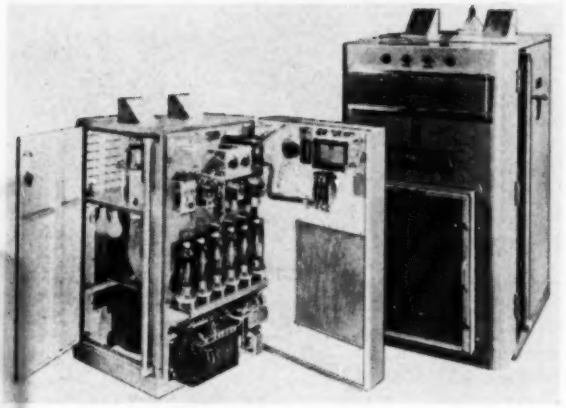
The hot potato was not dropped at that point, however. Instead, the very next move made was to investigate plant operations where trouble and dissatisfaction had been reported. Fortunately, this investigation disclosed that in the majority of cases where any difficulty was reported, the fault had been with something other than the electronic gluing process itself. Most users reported this method of gluing to be definitely efficient and practical, when the equipment was properly selected and tooled up and used according to established procedure within limits prescribed by equipment and adhesive manufacturers.

Introduction

A review of the many plant gluing operations studied during the course of this survey indicates, as is usually true with any newly developed process, that the major problem to be dealt with involves the development of skilled electronic equipment operators. Mechanical problems can be remedied readily by equipment service engineers. Some operators said to possess top skill in this field were found to be unfamiliar with various phases of the many problems which naturally arise in electronic gluing of wood constructions.

A consensus of opinion among experts indicates that efficient operation of electronic gluing equipment, especially during the setting up and preliminary stages, requires a thorough knowledge of high frequency electricity and equipment, dielectric heating, and the fundamentals of their application in the different methods of bonding and assembly-gluing of wood constructions, as well as a sound knowledge of wood and its utilization problems. Furthermore, efficient electronic gluing must be predicated upon a good understanding of the chemistry of synthetic resin adhesives commonly used along with knowledge of the mechanics of physical chemical adhesion and the action of these adhesives under electronic heat. It may be possible that after this electronic equipment is in operation, it can be sufficiently automatic for the unskilled operator to use.

Dielectric heating employed in the electronic gluing process is a form of electronic heating which generates heat



Thermatron six kw. electronic generator operates with one Westinghouse oscillator tube and six rectifier tubes to automatically bring power gradually up to maximum, with cut-out switch, interval timer, single dial power control, power output indicator, line switch and meter switch.

Courtesy, Radio Receptor Co., Inc.

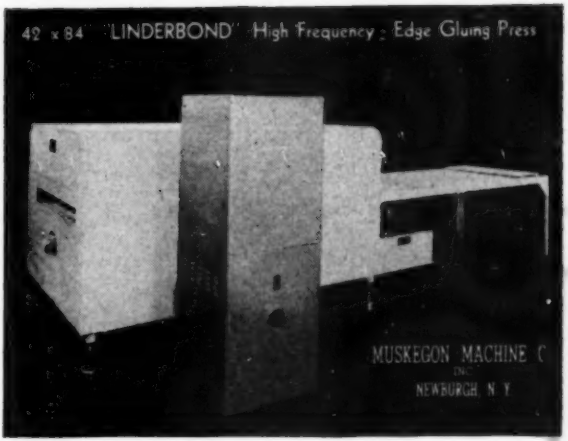
within the wood by a molecular disturbance due to high voltage stresses produced by the use of alternating currents at high frequencies—up to millions of cycles per second. Equipment used to furnish this dielectric heating energy is essentially some form of radio frequency generator (vacuum tube, spark gap, or motor generator frequency changer) which acts as a frequency converter to draw 60 cycle current from the power line and to deliver radio frequency power to its output terminals and to the load. The power for most of the electronic gluing equipment covered in this survey was supplied by vacuum tube generators of the radio frequency oscillator type.

These generator units usually operate from standard 220 or 440 volt plant power sources and are 3-phase. Some of the smaller portable units operated from 110 volt lighting power sources and were single phase. In the sequence of operation an electronic rectifier takes incoming alternating current electric power and delivers the required high voltage direct current to the oscillator tubes and related circuit elements. Here the high voltage direct current is changed to alternating current of the desired radio frequency for transmission through the transmission line to electrodes for applying dielectric heat to the work load. Various associated control and timing devices are also used. The power rating of a radio frequency generator is the output power of the unit; the power input is roughly twice this rating.

The Radio Generator

An electronic heating authority classifies the radio generator as a vacuum tube oscillator, with part functions described as:

1. Plate transformer—used to step up 60-cycle line voltage to a high radio frequency value.
2. Rectifier tubes—used to convert infeed alternating current to direct current.
3. Oscillator tubes—used as high speed switches to break up direct current into required radio frequency pulses.
4. Tank circuit—used as a resonant circuit to build up high circulating current in the circuit through excitation by the pulses with a high radio frequency voltage across it.



General Electric dielectric heater used with Linderbond high frequency edge gluing press.

Courtesy, General Electric Co.

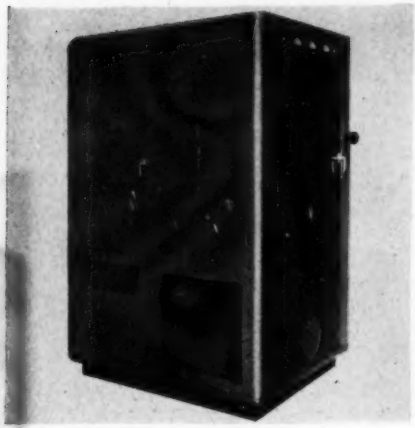
5. Load coupling and load matching network—with capacity for adjustment to obtain proper flow of power from the tank circuit to the load circuit.

Plant voltage and voltage regulation seem to be most important. Where the power supply is heavily loaded, it is often necessary to provide additional capacity. Shorter curing times are possible by having a maximum amount of power passing through the work. Power supplied to the work load is said to be approximately proportional to the square of voltage across the load. There are, however, voltage breakdown limits, and voltage and current proportions should allow a factor of safety for possible voltage breakdowns.

The maximum voltage that may be used is determined by such factors as density and thickness of the wood between the electrodes, the power factor of the material, and the frequency of the applied voltage. Voltage is also limited to values that will not cause arcing or breakdown, in order to limit the amount of power which may be used for any particular work load. This maximum amount of power is also one of the determining factors in any minimum curing cycle.

Operational Procedure

Actual operational procedure involves establishing proper relationship between required voltage per inch of work thickness, frequency, and tuning characteristics of the radio frequency generator unit. Load matching network requirements are determined by work load electrical capacity which in turn is dependent upon load size and type of electrodes used. Most circuits are sufficiently self-regulating to maintain power output at proper level to insure a uniform amount of glue curing, even when the load characteristics and load impedance change during the heating cycle. Heating time at the glue line, however, is seldom less than 15 seconds because setting of any of the resin adhesives commonly used in electronic gluing is essentially a time-temperature reaction and excessive voltage would be required for shorter curing cycles.



Courtesy, Radio Corp. of America.

RCA electronic power generator operates with improved type vacuum tube oscillator and built-in forced draft cooling system. Oscillator and rectifier compartments protected with automatic high voltage grounding switches and control may be manual, semi-automatic or automatic as required. Four tank circuits are available—6, 13, 27, and 42 megacycles—for wide field or dielectric heating applications.

A typical standard model 10 kw. radio frequency generator will require a 3-phase, 220 or 440 volt power supply, with an input of about 23 kva at 95% power factor when fully loaded, and will have standby power of about 2 kva between heat cycles. Radio frequency generator units are available for electronic gluing operations in standard sizes from ½ to 50 or 100 kw. Most of these generators use the standard output rating of the National Electrical Manufacturers Association.

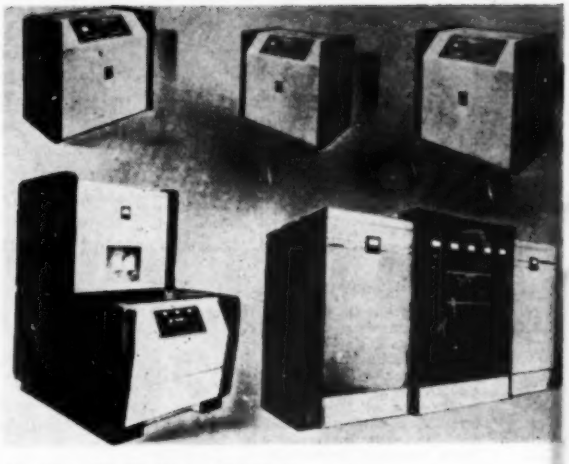
Most of the radio frequency generators studied had their oscillator tubes arranged singly or in parallel, with one side of the output grounded. It was explained that this is done primarily to simplify design and adjustment as well as to reduce cost. Also, that this arrangement makes possible remote generator location as well as continued operation of the generator at half-power, should an oscillator tube fail, and requires no balancing controls.

Investigation of operation and working life of oscillator tubes disclosed the cost per kilowatt of tube generally increases as operating frequency is increased. The average life of these tubes was estimated at about 5,000 working hours, although some had been reported to have had an operating life up to 15,000 hours while others failed after 1,000 hours or less. Users and manufacturers agreed that tubes properly designed and installed should give the average performance cited above. This will be true provided line voltage is controlled and generator units in which they are installed are operated within the manufacturer's rating recommendation. These oscillator tubes are usually designed to handle a plus or minus 5% voltage variation.

Radiation Troubles

During this discussion of oscillator tubes the fact was brought out that while the frequency of oscillations also increases the rate of heating, it is limited in those cases where the area of the load is large, as it could result in a standing wave pattern which would cause non-uniform heating. This led directly to consideration of radiation troubles.

Most radio frequency generator units operate with much the same function and closely resemble transmitting units used in radio broadcasting. As a matter of fact, much of the early experimental work in the electronic gluing field was done with standard radio broadcasting equipment. Generators currently used in electronic gluing operate in a frequency range of 3 to 20 megacycles, similar to that used in aircraft, police cars and ships.



Westinghouse radio frequency generator units.

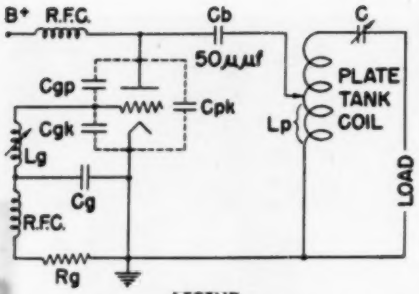
Courtesy, Westinghouse Electric Corp.

While radiation is much desired in radio broadcasting, it is a very troublesome fault in electronic heating. All radio frequency heating units used in electronic gluing radiate considerable energy in operation. With the increased use of electronic gluing equipment this radiation became so troublesome that the Federal Communications Commission took steps to have rules and regulations set up to define frequency bands for electronic gluing equipment operation to prevent continued interference with commercial radio communication services. Frequency bands and band widths were assigned in 1945.

According to W. C. Rudd, of Induction Heating Corp., Brooklyn, N. Y., subsequent difficulties encountered in trying to meet these requirements were quite common due to the tendency for a work load to change its electrical characteristics as it is heated. Where radiation was confined to the generator alone, correction was accomplished by the use of fixed-frequency generators arranged with special load following equipment to feed power at a varying load, or using generators which change their frequency of operation as changes occur in the electrical characteristics of the work load. When a great part of this radiation trouble was discovered to be due to exposed conductors of the radio frequency current as well as to differences of potential on large metal parts, shielding of this electronic equipment finally proved to be most efficient.

On the basis of data collected on radiation from this type of electronic equipment and cooperative meetings with the FCC by the American Institute of Electrical Engineers and the National Electrical Manufacturers Association, a value of 10 microvolts per meter at one mile was agreed upon for industrial induction or dielectric heating equipment and changes were made in assigned frequency bands. These were published in Public Notice 7722 of the Federal Communications Commission, which states that industrial induction and dielectric heating equipment may be operated within any of the assigned frequency bands with an unlimited amount of radiation from the equip-

degree of safety.



LEGEND

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R.F.C.	:	Radio Frequency Choke Coil
Rg	:	Grid Bias Resistor
Lg	:	Adjustable Inductance
Cb	:	Plate Blocking Condenser
C	:	Adjustable Condenser
Lp	:	Inductance of Tuned Plate Circuit
Cgp	:	Grid-Plate Interelectrode Capacity
Cgk	:	Grid-Filament Interelectrode Capacity
Cpk	:	Plate-Filament Interelectrode Capacity
Cg	:	Grid Condenser

Fig. 1. Schematic drawing of a simple oscillator used for dielectric heating.

ment, or outside the assigned bands with a maximum radiation of 10 microvolts per meter at one mile.

Equipment Must Be Certified

The National Electrical Manufacturers Association recently notified all users of industrial induction and dielectric heating equipment that their equipment must be certified by a competent engineer or manufacturer, on or before June 30, 1952. Equipment must comply with minimum radiation requirements for all equipment installed or manufactured prior to July 1, 1947 to the provisions of "FCC Rule and Regulations, Part 18," relating to radiation and communication interference from industrial induction or dielectric heating equipment. A complete copy of "FCC Part 18, Rules and Regulations Relating to Industry, Scientific and Medical Service" may be obtained from the U. S. Government Printing Office, Washington 25, D. C.

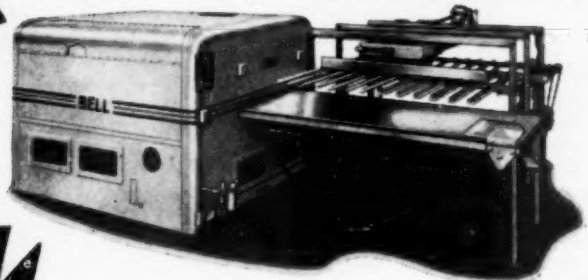
Where the equipment is operated inside the assigned frequency bands, the certificate describes equipment and conditions of operation, briefly describes tests and results, and states that equipment may be reasonably expected to meet frequency stability requirements for a minimum period of three years. Where the equipment is operated outside of assigned frequency bands, it is tested to determine the amount of radiated field and the certificate states that it may be reasonably expected to meet maximum radiation requirements for a minimum period of three years.

These certificates of compliance do not, however, relieve the owner of the electronic equipment of responsibility for eliminating actual interference caused by his equipment. Reports of such interference must be followed by immediate steps to eliminate this interference. According to good authority, these rules and regulations generally apply to equipment manufactured after June 15, 1947, but do not apply to existing equipment for a period of five years from July 1, 1947.

New FCC frequency changes which were to be fully in effect by June 30, 1952, assign the following frequency bands and band widths for electronic dielectric heating equipment: 13.560 megacycles plus or minus 6.78 kc.; 27.120 megacycles plus or minus 160 kc.; and 40.680 megacycles plus or minus 20 kc.

All of the commercial radio frequency generator units seen in operation at various woodworking plants were certified to be within limits as to radiation. Equipment manufacturers generally advised that their generators were suited to operate with standard presses and jigs, which they have already tested in duplicate installations. However, they do require tests to be run on special press or jig arrangements to be powered by their generators to prevent radiation interference. They seem to

*EVERY USER IS ENTHUSIASTIC!



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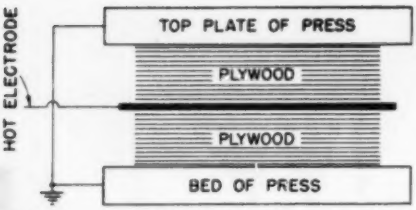


Fig. 2. Plywood load showing application of through or perpendicular heating method.

feel their product reputation warrants this precautionary procedure. They also reported that in practically every case of reported radiation interference installation of proper shielding has effectively eliminated radio communication interference.

Proper Shielding

This shielding is usually used in the form of aluminum or copper fine mesh screening sections installed to enclose the press and/or jig and electrodes, which allow inspection and ventilation, and the use of well-shielded transmission lines to the press or assembly jig. These radiation shield sections and the generator case are well bonded together and well grounded to prevent any differences of potential between the sections or straying high frequency voltage. A positive ground is usually effected by sweating the ground into something like a water pipe.

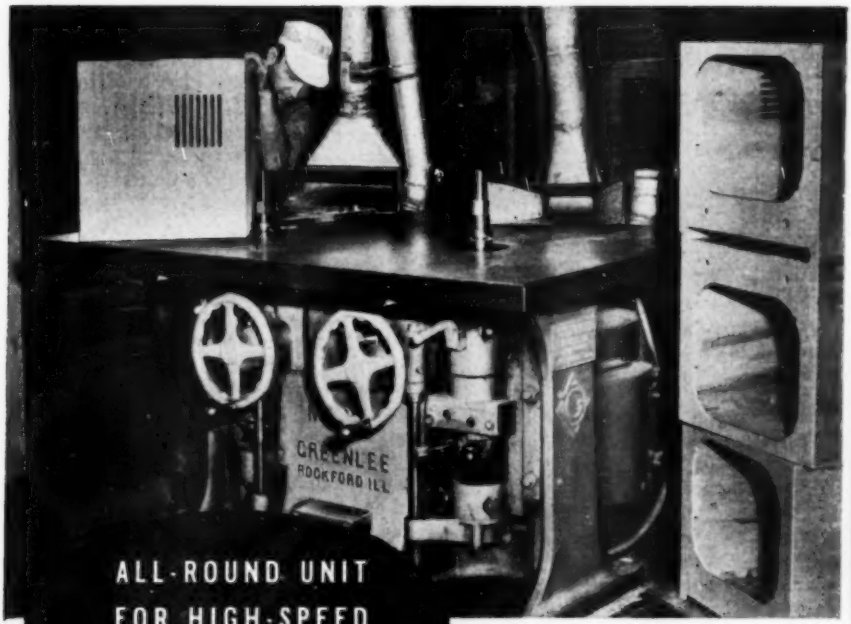
A typical installation of an electronic edge gluing press was observed in which the whole construction was enclosed with a fine mesh copper screening in sections which completely enclosed the ends. Loading and unloading doors were arranged to open and close with the opening and closing of the press, so they were always closed when power was applied from the generator unit through a shielded transmission line run from the generator to the press in the shortest line possible. Besides shielding the press from radiation, the shielding also acted to protect the operator from accidental contact with either the electrodes or the transmission line.

Discussion of this particular hazard with an electronics engineer brought out a statement that high frequency current, as used in electronic gluing, travels on the outside of the conductor or wires when the current alternates at the high frequencies used. He claimed that should an operator accidentally contact the conductor carrying this high frequency current, the high frequency current would travel the skin outside of his body and would not strike inside. Therefore, while painful burns would probably result from this accidental contact, any danger of death by electrocution would be slight. This engineer would not say he had put this theory to actual test nor did he know of anyone else who had done so.

Importance of Electrode Design

A general survey of electronic equipment faults contributing the most trouble pointed to improper electrode design as the chief offender. In many cases arcing and burning could be traced to the use of electrodes with too sharp corners. The use of wooden electrode fixtures instead of constructing them with arc-resistant materials was reported to cause trouble in some cases. Arcing was also found to be due to improper adhesive formulation with strong electrolyte to create too highly conductive glue lines. Flash-overs appeared more prevalent where air gaps occurred between the work load and one or both electrodes. In those cases where it was necessary to provide air gaps deliberately, arcing was constantly produced when air gaps picked up excessive glue squeeze-out.

Extreme line voltage variations were found to greatly shorten tube operating life. In those cases where this condition could not be adequately remedied



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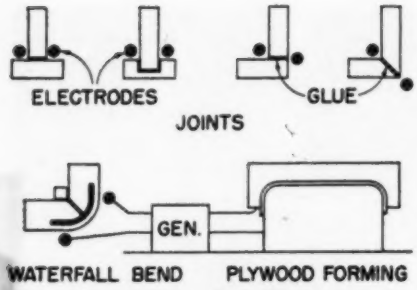

Figures 1-3, courtesy, Cathode Press.

Fig. 3. Electrode arrangements for electronic gluing of wood joints in special jigs by stray field heating method.

at the source, automatic regulating transformers were used for the generator oscillator tube filaments. It was seldom deemed necessary to stabilize the entire input to the generator, but it was said this was sometimes done when the plate voltage became sufficiently variable to seriously affect the power output of the unit.

Although manufacturers of electronic gluing equipment generally design their generator units to make operation as automatic as possible, operators find it necessary to keep the circuit of the radio frequency oscillator tuned with the work load being heated for efficient performance. The reason for this was explained as a variable condition occurring during the heating cycle, electrical characteristics of the load changing with temperature, which requires progressive adjustment. As the heat in the work load increases, the wood loses moisture, changing capacity and balance with the radio frequency oscillator circuit. Therefore, some means of keeping the circuit in tune, either by manual or automatic means, is required to keep the heating unit operating at top efficiency throughout the curing cycle.

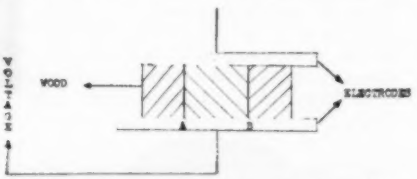

Fig. 4. Schematic sketch of edge glued panel bonding load showing application of selective or parallel heating method. A and B are glue lines.

Tuning the Load

Since the electrodes have a considerable capacity, tuning the load requires that an inductive reactance be provided equal to the capacitive reactance of the electrodes. The arrangement varies with different makes of generators but the purpose is always to act as a variable-ratio transformer to vary the voltage across the electrodes. In some units this has been provided by means of a simple U-shaped copper bar section with a shorting bar to provide variable electrical length.

Where the work load is close to the generator unit, this circuit may be coupled to the tank circuit of the generator, usually without requiring a matching circuit. If the load is located some distance from the generator, a transmission line is generally required. This may be some sort of concentric line (one conductor inside another) to prevent a mismatch that might cause line loss and arc-over. It is also necessary to provide a coupling or matching circuit where this arrangement is used.

Tuning units may also be used which operate with a variable center coil and a pair of adjustable series coils. One of these units employs a Ring tuner, patented by Woodwelding, Inc., as the variable center coil. When this tuner is operated, switches on the series coils change the electrical length of each side of the circuit by shorting out portions of the coils. The Ring tuner, or variable center coil at the center allows close adjustment between the steps of the switches.

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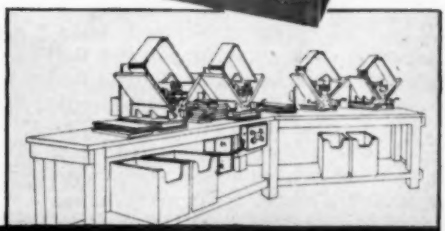

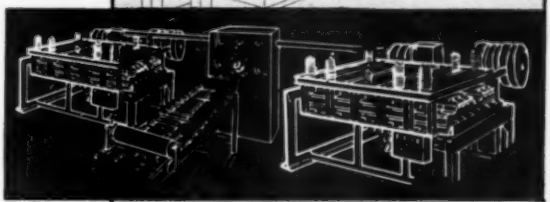

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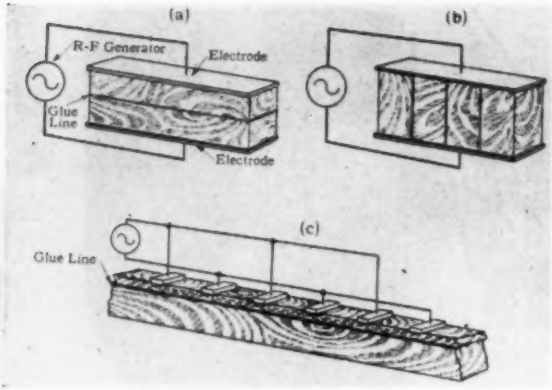

Fig. 5. Heating methods used in application of R.F. power for wood gluing: a) perpendicular or through heating, with electrodes placed parallel to glue lines; (b) parallel or selective heating, with electrodes placed perpendicular to glue lines; (c) stray field heating, with fringing field between adjacent electrodes used to set up glue lines accessible from only one surface.

There are other interposed units between the generator proper and the electrodes but all serve to regulate the voltage delivered to keep it proportional to the size and characteristics of the work load. They serve much the same function as an automatic automobile transmission system. Preliminary tuning is required when first setting up for a new job, even where the generator is equipped for automatic tuning. This resembles the process of tuning in the conventional home radio and may be performed by a meter installed with the generator or a high frequency volumeter may be used.

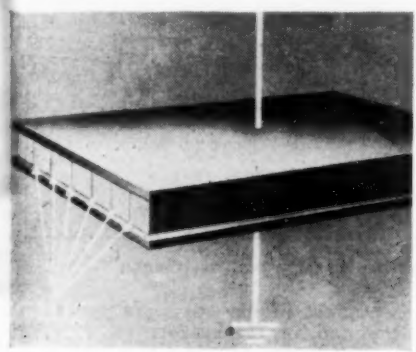

Fig. 6. Electrode arrangement for edge gluing by parallel heating which permits most of the R.F. power to be absorbed in glue lines where it is desired.

A radio frequency resonance analyzer meter is sometimes used to check the frequency of an electrode setup to permit necessary corrections to be made to tune the electrodes to the proper frequency before connecting the generator unit with the work load. This analyzer is usually a low-power tunable oscillator which indicates the resonant frequency of the electrodes to show how far out of resonance they are. Authorities state that the electrodes should be resonant to the same frequency as that of the generator unit for operation to provide efficient heating and fast production.

In the use of the radio frequency analyzer meter it is connected to a convenient power outlet (60 cycles, 110 volts) and the probe is touched to the electrodes. A dial knob on the meter is then turned slowly until an indicating light on the unit starts to dim. The frequency may then be read directly on the dial. If this frequency is not the same as that of the generator unit, the equipment must be tuned until the elec-

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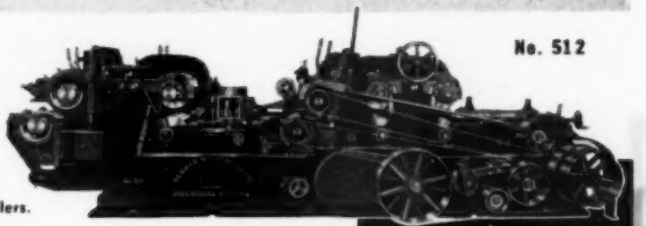

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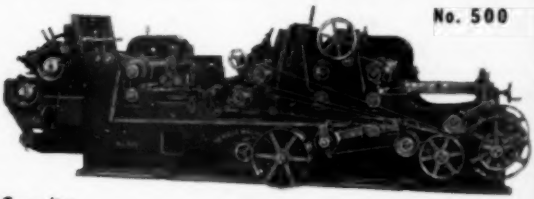

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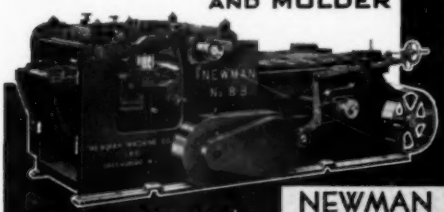

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trodes register exactly the same frequency as the generator.

Electronic Heating Methods

Various electrode types and arrangements were observed but three fundamental electronic heating methods, governed by size, shape and accessibility of the work load, determined their application. These were: selective or parallel heating, used for core and panel edge gluing, veneer splicing and some assembly gluing operations; through or perpendicular heating, used where laminated sections are to be glued either as flat sheets or curved panels, also used in many cabinet assembly gluing jobs; stray field heating, for attaching rails, stiles and mounting blocks to underside of cabinet panels and other assembly gluing operations and spot welding.

Selective or parallel heating was generally agreed to be the most efficient method of electronic heating, particularly for edge gluing, but is confined to applications where there is only a small distance between electrodes placed in perpendicular contact with the glue line. The electrodes provide a simple parallel plate capacitor with the wood and glue acting as the dielectric in an electro-static field parallel to the glue line. Although the load is usually under pressure, the electrodes need not be in direct contact with the load.

This electronic heating method concentrates most of its heating effect in the glue lines to speed setting and curing. It was stated that tests made showed a glue line temperature of 200 degrees F. while wood only 1/8" away from the glue line was only 100 degrees F., in a selective heating press. While selective heating is reported as being used successfully to cure glue lines as wide as five inches on hardwoods, most operators seemed to consider four inches the maximum for

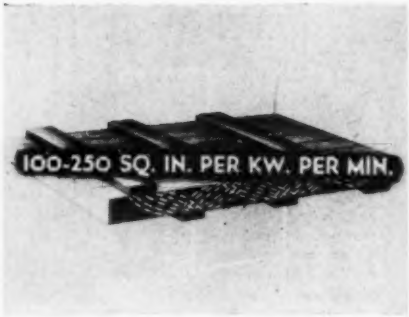

Fig. 7. Strip electrode arrangement used in partial gluing to cure sections of the glue line (see dotted lines) for greater press production in edge gluing cores or panels.

best results. They also warned against using highly conductive glues with this heating method because of the direct contact of electrodes with the glue.

Cold-setting synthetic resin glues seem to be accepted as most suitable for use with selective or parallel heating, formulated to keep arcing at a minimum. Urea-formaldehyde glues seem to be most used in production edge gluing and melamine, phenolic and resorcinol glues much used for long-life, boil-proof bonding. The speed at which any adhesive cures in the glue line depends primarily upon the electrical characteristics of the glue itself which vary in sensitivity to treatment by dielectric heating. Catalysts added to speed curing contain high or low conductivity according to the speed of curing required.

Through or perpendicular heating is without any doubt the oldest electronic heating method and length or width of glue line does not limit its application since the electrodes are placed parallel with the glue line to direct the current across the glue lines or through them. This is a through heating process in which the mass of wood is heated to the same temperature as the glue line,

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although some preferential heating does occur along the glue lines due to their higher conductivity.

More power is required than for selective or parallel heating and longer curing cycles are required. The reason for this is that there is little danger in heating resin glue rapidly but destruction of the wood structure might occur when a high-speed, high-heating cycle is used. Furthermore, since this method is used primarily in the bonding of flat, curved or molded plywood and other laminated wood constructions, heating temperatures must be kept below the boiling point of water to prevent building up of internal pressure within the work load.

Through or perpendicular heating provides little chance for direct electrode contact with the glue. Temperatures are more constant with this method of heating and highly conductive glues are used with little danger of arcing except in the case of excessive glue squeeze-out. Resin adhesives of the cold-setting type seemed generally considered best suited from a production standpoint and are used with higher conductivity characteristics than for selective or parallel heating. Glues used in various electronic gluing operations using this heating method included high room-temperature and intermediate-temperature setting urea, resorcinol and phenol-resorcinol adhesives of the type originally developed for cold pressing and some hot-press melamine adhesives. Electronic equipment manufacturers advised that any heat-sensitive adhesive may be used in this through heating process but that resin adhesives seemed to be the most practical.

Stray field or fringe area heating is generally used to set glue lines that are not accessible for electrode application at both surfaces, as in assembly joint

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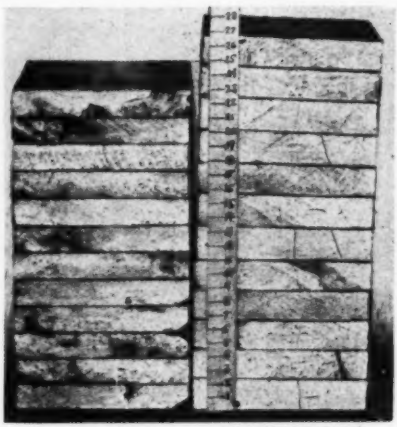

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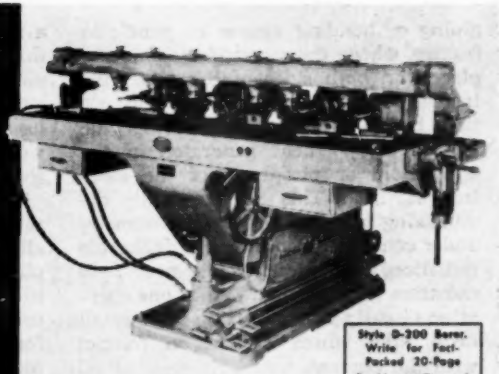

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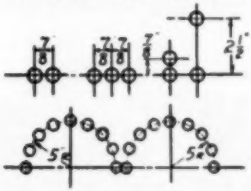

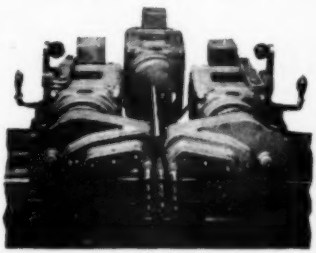

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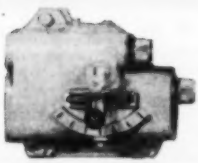

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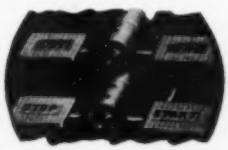

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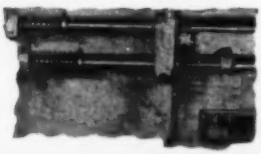

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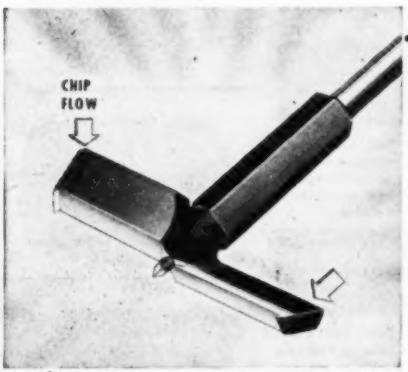
gluing or bonding veneer or panels to frames, where the electrodes cannot be placed on both sides of the glue line. Instead of heating in an electrostatic field between two electrodes, the glue line is set by heat generated in the stray field or periphery of the electrostatic field. This is a gradually diminishing field of appreciable intensity under controlled conditions of deliberate radiation. The extent of this stray field radiation was demonstrated at one operation visually through the use of a small neon tube which lighted on contact with the current.

More power is required by this method than for either parallel or perpendicular heating as the major input energy is confined to the direct field. The method is controlled in application by an electrode arrangement (usually parallel bar electrodes) so connected as to be at alternate high-voltage and ground potentials and arranged in such a manner as to cause the field to pass through the glue line to set it up. The method forms the basic operation principle of portable electronic hand guns used to weld or spot-cure glue lines as well as for some of the tapeless veneer splicers and patching units.

Adhesives similar to those used in selective or parallel heating were generally used for stray field heating applications, but higher temperature setting adhesives and higher voltages were used. There were also special glues formulated for this method to provide higher conductivity. Since there is little opportunity for direct electrode contact with the glue, arcing and burning is less prevalent in stray field heating.

Materials for Electrodes

All sources recommended the use of non-magnetic metals for electrodes. Aluminum, brass, copper, stainless steel and zinc electrodes were seen in use, with stainless steel generally preferred



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since it is more easily cleaned of glue. Although aluminum electrodes were used in many applications, they seemed to have a much shorter operating life because they were more easily destroyed by arcing. Metal films applied by the metallizing spray process were also observed on various molds for use as electrodes in some of the molded plywood electronic gluing applications.

Metal selection seemed to depend upon individual use application. Aluminum, brass, copper and zinc were used for electrodes where little or no contact was made with the glue, but stainless steel was used most where the glue lines were in contact with the electrodes. Copper and aluminum were used in many cases as long strip electrodes for laminated work and in sheets for service as plywood bonding electrodes under direct pressure. Brass and copper seemed to be preferred for bar and rod electrodes. The tendency of

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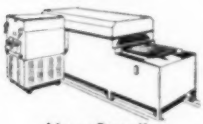

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zinc to wrinkle around the edges confined its use as an electrode material considerably for any direct pressure applications.

Investigation of thickness requirements seemed to indicate that high frequency current has little effect on the cross section of an electrode as it does not pass through the center. However, heat generated in the wood and glue dielectrically is transferred to the electrodes before being dissipated and the electrode material must be of sufficient thickness to carry this heat without buckling or wrinkling. Continuous heat cycling will affect any thickness in time, but good results seemed to be obtained in sheet thicknesses from .02" to .06" in plate presses and .05" to .06" thickness for edge gluing units. Where direct pressure is involved, as in bonding plywood, electrode thickness must be suited to the job to be done with no variation in

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electrode thicknesses used for a single multi-station press charge.

Electrodes observed ran a gamut of shapes and sizes, from flat plates and strips to formed bars and rods. Telescoping tubes were used in the electrode unit of an edge gluing press to accommodate various widths of panels. Single and double grid electrodes were also used, closely spaced for surface work, with spacing increased as the depth of glue line to be heated increased. Latticed electrodes were used for partial gluing to set up the glue line in a zigzag pattern, with the cold electrode usually step-staggered to the top hot electrode.

Electrodes for use in the vacuum bag molding of plywood were provided by spraying the mold with a metallized coating for one electrode and using a fine mesh metal screen cloth (usually copper) for the other. Electrodes used for plywood cylinder bag mold consisted of an inside copper mold sheet lining and an outside galvanized steel cylinder. Wide flexible tinned copper straps were used as electrodes to mold juke box ends and long copper and aluminum strip electrodes were employed in gluing up long aircraft laminations. Aluminum and copper sheet electrodes affixed to hardwood mold surfaces were used for press laminating with rubber applied on pressure surfaces outside of the high frequency field.

Pressure electrodes used for edge gluing veneer sheets turned out to be a pair of aluminum corrugated platens which contacted the upper surface of the veneer to serve as twin electrodes spaced about two inches apart. Presses used to edge band table tops were equipped with T-shaped copper electrodes. Plywood press platens were used as electrodes in some applications; metal sheet electrodes were used over the veneer lay-up in others. Three elec-

trodes were used for thick batches, with the electrode in the center of the batch serving as the hot electrode and the outside two electrodes connected together and grounded to the press. Instead of large flat electrodes, small bars were used perpendicular to the glue line in some presses, about one inch wide and spaced on about six-inch centers and arranged with hot electrodes on one side of the panel and ground electrodes on the other.

Metal rod electrodes of various shapes and sizes were used for assembly joint gluing placed either in direct contact with the glue line or as close as possible to it and isolated from other metal parts to prevent field distortion and power loss. These rod electrodes are usually shaped to follow joints in assembly gluing and are installed in wooden jigs to lie flush with the surface. Most contact electrodes were backed by resilient materials or were molded into such materials, always selected for electrical properties. Carbon-free dielectric rubber was a popular material for this application.

Portable electronic hand guns used for spot welding or spot curing of glue lines provided a wide range of sizes and shapes of electrodes. Although some of these units were equipped only with parallel fixed bar electrodes, others had interchangeable electrodes suited to different types of work. Short electrodes (usually about three inches) were used for heavy loads to heat wide widths; long (usually about six inches) for small loads to heat narrow widths; outside right angle for exterior corner gluing; inside right angle for interior corner gluing; short roller electrodes for application with an ironing motion of laminated or plywood surface for wide heating; long roller electrodes for similar application for narrow widths and light loads and special silicone impregnated Fiberglas shoes to prevent marring a finished or smooth surface.

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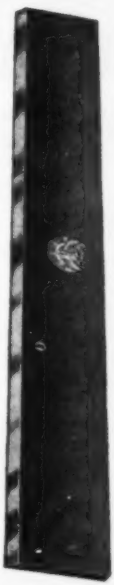

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Some electrode fixtures seen were insulated with ceramics, mica glass-bonded material, or other more expensive arc resistant materials for support. Most of the operators interviewed, however, seemed to feel that hardwood, particularly varnished kiln-dried maple, is a more practical and inexpensive material for support and insulation of electrodes and fixtures. Some fiberboard and hardboard were also used.

Electrode Arrangement

A point stressed as most important by many operators in regard to electrode arrangement was making provision for proper overhang of the electrodes. The rule of thumb commonly used states a requirement of an overhang of a minimum of the thickness of the load and twice the amount, wherever possible. Solid electrodes were favored only where good electrical coupling circuits were provided because of their low electrical impedance. In general, low impedance electrodes which provide large areas of thin loads were avoided.

It was also generally agreed that where the material to be heated is flat or square and is similar in characteristics, the electrodes should be flat and parallel. In curved work they should be equally spaced at all times. There should be little or no air gaps between the electrodes and the work in normal parallel or perpendicular heating, but this is not as important in stray field heating. Electrodes for edge gluing were solid or staggered in arrangement. Where less than 100% glue line setting was required, the usual electrode arrangement was staggered and spaced to compromise between speed and impedance requirements. This spacing is directly dependent upon the dielectric constant of the wood, varying with the species and moisture content.

A wide variety of special electrode arrangements were seen and new ones

are being developed daily for special electronic applications. Electrodes were also shaped to provide uniform heating for wood constructions of irregular shape and non-uniform thickness. In a discussion of arcing difficulties caused by improper electrode design, a service engineer stated that while the amount may vary with the radio frequency voltage for which the particular setup is designed, for average electronic gluing the corners and edges of electrodes should be rounded to a minimum of 1/16" radius up to as much as ½" radius to prevent arcing. Corners that are too sharp usually cause a concentration of the electrical field at this point to set up a tendency to ionization of the air to arc and burn material adjacent to them.

This should pretty well cover the general features of electronic gluing equipment studied in the course of this survey. While a few makes and models of generator units may have been unintentionally overlooked, it is believed fairly comprehensive coverage was afforded by a study of the following generator units which served as the heart of the various electronic gluing systems:

Electronic Devices—R. H. Nichols, Ltd., Toronto, Canada

Allis-Chalmers—Allis-Chalmers Mfg. Co., Milwaukee, Wis.

G.E. dielectric heater—General Electric Company, Electronics Dept., Syracuse, N. Y.

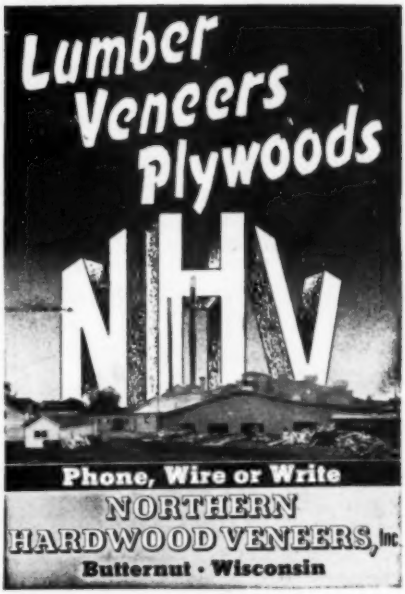
Gludryer—Pico Machinery Corp., Los Angeles, Calif.

Mann-Russell—Northwest Syndicate, Inc., Tacoma, Wash.

RCA—Radio Corporation of America, Electronics Apparatus Section, Engineering Products Div., Camden, N. J.

Raybond—Electronic Heating Corp., Newton Highlands, Mass.

Raytherm—Raytheon Manufacturing Co., Waltham, Mass.



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RFC—Radio Frequency Corporation, Medfield, Mass.

Reeve—Reeve Electronics, Chicago, Ill.

Thermatron—Radio Receptor Co., Inc., Thermatron Div., Brooklyn, N. Y.

Thermex—Girdler Corp., Thermex Div., Louisville, Ky.

Thermonic—Induction Heating Corp., Brooklyn, N. Y.

Westinghouse—Westinghouse Electric Corp., Industrial Electronics Div., Baltimore, Md.

Woodwelder—Woodwelding, Inc., Burbank, Calif.

These are all electronic dielectric heating units operating basically as previously described to provide speed and uniformity of heating by dielectric heat for bonding glue lines of wood constructions placed, compressed or conveyed between electrodes, glue curing with the application of high frequency alternating voltage controlled to suit the work load. These manufacturers generally can provide complete units, including tuning and work handling devices, for the electronic heating of wood and glue work loads of various shapes, sizes and constructions.

(To be Continued)

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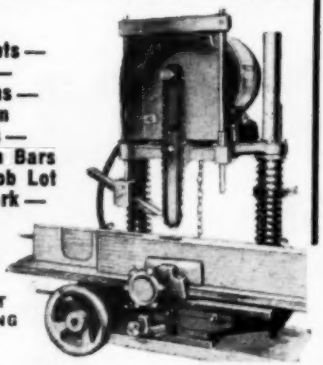

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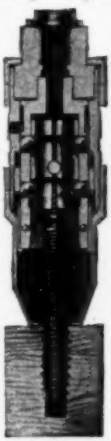

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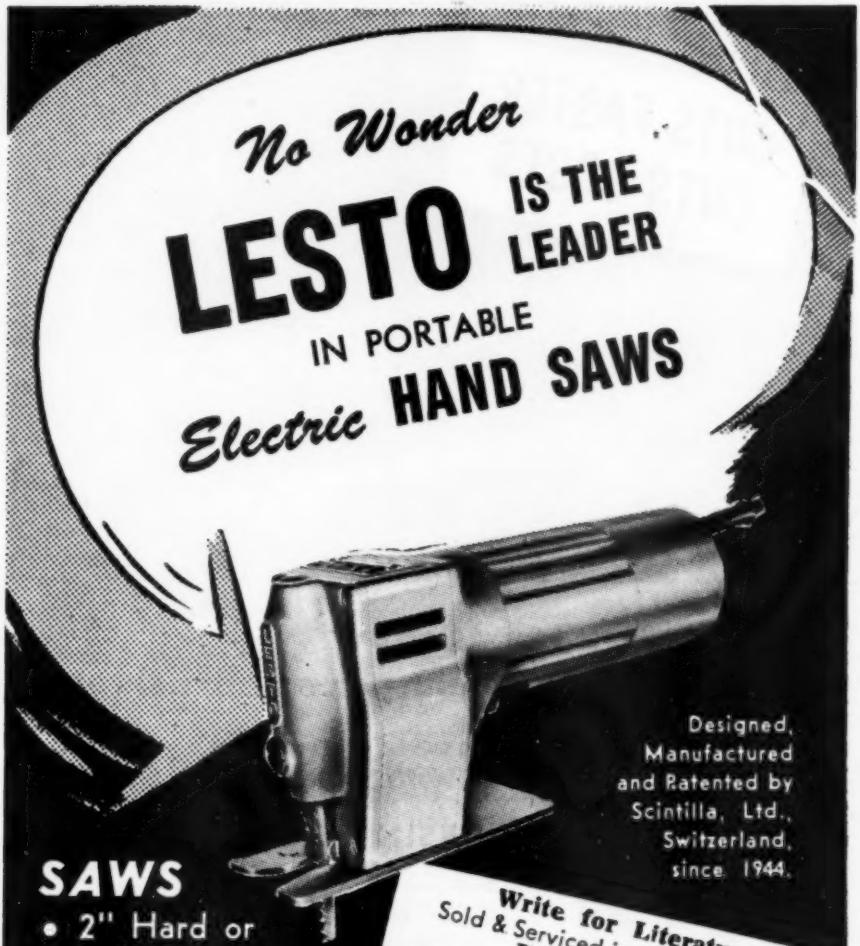

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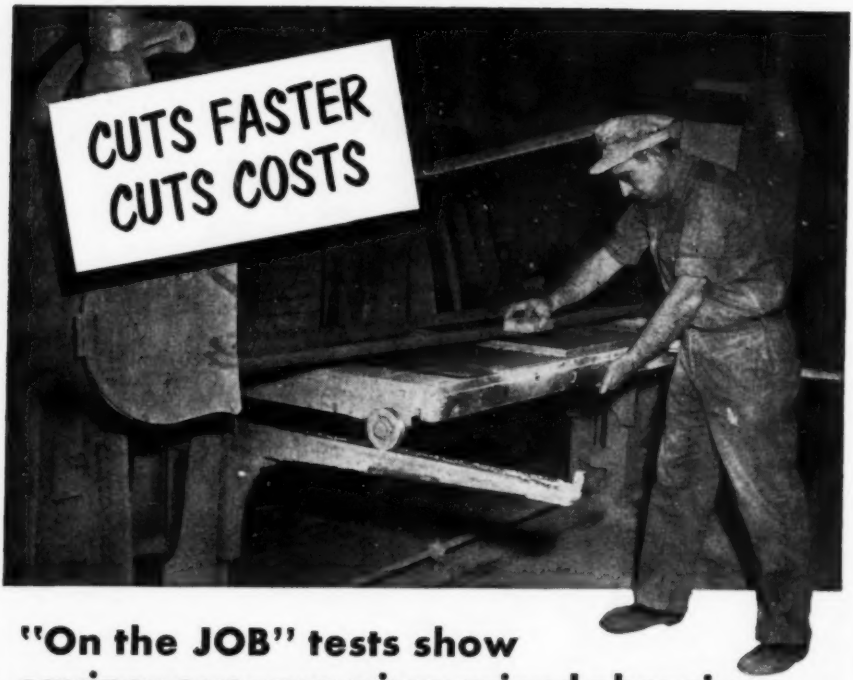

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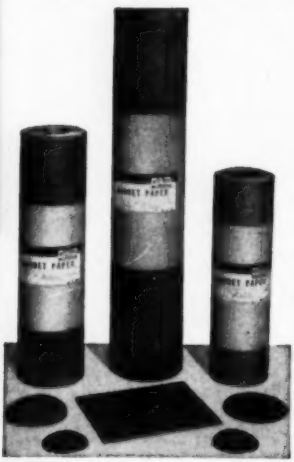

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WOOD vs. SUBSTITUTES

By J. L. Muller

Here is another in our series of articles pointing out some of the things that need to be done to regain lost markets and to aggressively meet the competition our industry is receiving from the various "wood substitutes." This speech was first presented before the National Hardwood Lumber Association by Mr. Muller, acting secretary-manager for the association.

THERE IS no other material in the world which has greater market opportunities nor greater competition than wood. The problem of so-called substitutes has always been with us and always will for the simple reason that wood enters into every nook and cranny of our every day business and personal life. A material so far reaching in its usage—employed in the biggest consuming markets of the world—construction and home building, the railroads, the packaging industries, furniture, ship and boat building and many others, is bound to have competition. Our markets are certainly enviable.

We seem sometimes to be misled by the illusion that we can kill off the substitute. If so, we'd better take another look. As a matter of fact, we can put away our guns. We don't have to shoot anything or anybody. We've got a product to sell that is unexcelled in its variety of properties and usefulness and a source of production provided by the greatest engineer, the greatest scientist, and the greatest technician that can exist—the good Lord Himself. In the words of Joyce Kilmer, "Only God can make a tree."

What then should we do to meet this problem of substitutes? First we should open our eyes and our minds—to realize fully the great qualities of hardwood lumber, increase our knowledge of it; sell it properly; take advantage of its versatility; see to it that it is properly manufactured and properly used; adapt its finished form by continuous development to meet the changing times and changing use requirements; and above all else to hold on to and develop the markets we already have. We sometimes give too much emphasis in our thinking to the finding of new markets or new uses for wood. I doubt that we can ever find a new use for wood because it has been used and is being used for every conceivable purpose.

We need to be concerned more with the loss of our markets rather than the finding of new ones. In practically all instances, when we speak of finding or having obtained a new market for wood, we discover on second thought that actually such is not the case. We either regained a lost market or we have a better, improved material which we believe will knock out the substitute that crept in.

Some 20 years ago, while a student at the Syracuse College of Forestry, majoring in wood utilization, my "prof" laid down a guiding principle—"Use wood where it will serve the purpose best." There is strong logic in this statement and its considerate application would be of greater value than trying to

demonstrate that wood can be used for every purpose. Taking these same words and twisting them about slightly, we can derive another good principle—"Use wood best for the purpose." The criticisms often heard of wood in ninety-nine times out of a hundred is not the fault of wood itself, but because it was improperly used in construction or the wrong species or wrong grade may have been used, or it may have been poorly manufactured. Our market losses can be attributed to a great degree to our own negligence or our sins of omission.

Let's not be foolish in our endeavors. Let's recognize that despite the fact that hardwoods have tremendous qualifications, there are some uses for which it is not the best material. Some instances during the last war that seemed downright ridiculous, can be remembered. Do you recall the great publicity given to the chap who built wooden tires for his car when he couldn't get rubber? You may recall the publicity given to wooden man-hole covers when steel became unobtainable. Years ago, believe it or not, wooden chimneys were used. Yes, it is a gratifying demonstration of the versatility of wood, but is wasted motion to be misled by such adaptations.

I twisted the phrase a bit to put another angle to it— "Use wood best for the purpose." Much ill repute has come to us because of the failure of wood to meet the requirements of the job. These requirements may involve many things, including strength, appearance, cost. The lumber salesman can play an important part here. It is necessary for him to go beyond that of obtaining an order or obtaining a source of supply. He should concern himself more with the end use for which the lumber is to be put and perhaps the manufacturing problems of the consumer and to use his good knowledge in recommending a proper grade or species. A visit to the plant of the consumer to follow through and see how the material is working out would not only demonstrate a real interest in the manufacturer's problem, but also be gratifying to him and a source of good-will. Such a visit might very well suggest to the salesman an alternate grade or species which might be of greater advantage.

Wood is not always used the way it is supposed to be or it is not doing the job it is supposed to do. It is when instances of this kind arise that we find these substitutes coming in and doing a job which wood should do.

A neighbor of mine was an all-American end for Notre Dame. He told me this story. You will recall that in 1935 Ohio State had a cracker-jack of a team with some new razzle-dazzle techniques and quite a few tricks. They had beaten their opponents so far during the season by amazing scores. The Notre Dame scouts had done their job well and as a result Coach Leahy had devised a defense which he felt confident could stop them. The Notre Dame team was well instructed and trained not only to stop Ohio State, but to achieve a victory. However, the first half of the game ended with Ohio State leading Notre Dame 13—0.

During the half time the coach had only this to say to his first team, "You did not do the job you were supposed to do." He then addressed the members of his substitute team and gave them only one instruction—"Go out there and play the game as you have been instructed." During the second half, the substitute team played the entire period. They scored two touchdowns but missed both points after touchdown and with about a minute and a half left to play, the score stood Ohio State, 13 and Notre Dame, 12. With seconds left to play, a third touchdown was scored and Notre Dame beat Ohio State for one of the

biggest upsets of the season and played a game which will be forever remembered as one of the most exciting in the annals of football history.

Yes, it was a substitute team, but it did the job that the first team knew how to do, but failed to do. This also suggests another thought. Many of these wood substitutes are doing a good job and our disparaging comments may be another case of behaving like the ostrich, sticking our heads in the sand.

We can hold and develop our markets for wood and realize a demand fully equal to our capacity to produce and sell if we all collectively and individually do our jobs right.

These are some of the things we can do better than we have: (1) Acquaint ourselves fully with our product and increase our knowledge of it. (2) Do the best job of manufacturing and seasoning of which we are capable. (3) Product development—support and extend our research facilities to improve and adapt the inherent properties of wood to changing end use demands.

Here is an ad put out in the Sunday picture section of a daily Chicago newspaper by a leading manufacturer of home appliances: "We never stop trying to improve the things we make." I wish we could say the same for our industry. The ad goes on, "We believe the best way to make the customer come back for more is to give him a better product than he expected. We never begrudge the time, men and money it takes to make a good product better." It is a commendable policy.

A fourth point is salesmanship—"Using wood to serve the purpose best." Using wood in the best manner possible means the right grade and right species for the right use.

We keep selling each other on wood and wood products and do little about advertising with the non-lumberman and home owner and housewife who use our product. Our lumber trade journals are full of lumber ads and that's good, but how often do we see a lumber ad in the magazines and literature subscribed to in the home.

Then we should think of follow-through. We have one of the most efficient distribution systems of any industry, but it has one big fault—no follow-through. The manufacturer very seldom knows who actually is using his product. He sells to a wholesaler, a commission lumber salesman, who sells the retailer or commercial consumer. The movement of lumber is like Eliza crossing the river on a series of jumps from one ice floe to another. We need a bridge from the producer to the consumer, with each of the segments of the bridge an inherent part of the whole. All of us need to give heed to the consumer's needs and desires and take time consistently to help him with his wood problems and to see to it that he gets the most for his money with the fullest amount of satisfaction.

These are our responsibilities! Your trade associations are helping, but it takes individual effort also. We shall always have the problem of wood versus substitutes with us, but it will never get the best of us if we do our job of manufacturing and selling on a proper and commendable basis.

WORK BENCH

A sturdy new, economy-priced work bench with a top smooth enough for fine, intricate work, yet strong enough for rugged treatment, has been announced by the Shore Woodwork Co., 894 N. 40th St., Philadelphia, Pa.

The new table has a satin-finish top of laminated maple, on a girder-construction base that can be screwed or bolted to the floor if desired.

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They would choke the fountain of industry and choke all streams. In a country of unbounded liberty, they clamor against oppression. In a country of perfect equality, they would move heaven and earth against privilege and monopoly. In a country where property is more evenly divided than anywhere else, they rend the air shouting agrarian doctrines. In a country where wages of labor are high beyond parallel, they would teach the laborer that he is but an oppressed slave." **—Daniel Webster.**

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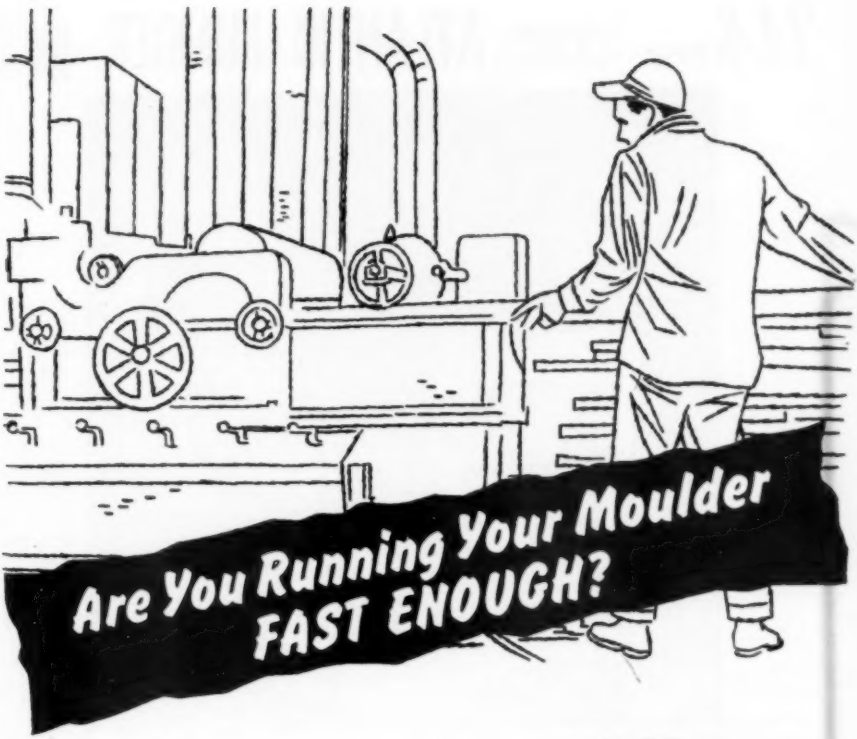

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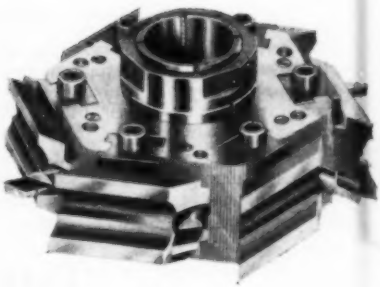

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Headquarters FOR HARDWOODS

Know your wood

LOCUST

BY NED BAILEY

IF YOU have never chewed the sweet succulent pulp from a not quite ripe locust seed pod, you have missed one of childhood's most pleasant experiences. This pod explains the reason for the name of one of the species, honeylocust. The other species, the black locust, has more practical reasons for being famous. First, the black locust is the best tree yet discovered to halt earth erosion; and second, its wood is the best material obtainable for insulator pins for power and phone transmission lines.

Neither the black locust nor honeylocust are really abundant, usually growing singly or scattered in small groups throughout open areas or in hardwood forests. The honeylocust, with its open plume-like crown of finely divided foliage and its thorny trunk and branches, occupies a great inland region of moist, fertile soil along meadows, streams and lake shores. Honeylocust is found from Ontario and western New York to Nebraska, south to Texas and northern Louisiana, and northward along the western slopes of the Appalachian and Allegheny mountains. This species nowhere grows in what would be called abundant stands.

The honeylocust reaches its best growth in the valleys of small streams in southern Indiana and Illinois. Usually it is a tree of medium size, with a short bole often divided near the ground. It varies in size from about 75 feet in height and a 2 to 3 foot trunk diameter to a maximum height of 140 feet and a 6 foot trunk diameter. The slender, spreading, somewhat pendulous branches form an open, flat-topped crown.

While belonging to the Leguminosae or pea family, botanists classify it with the Kentucky coffeetree and redbud, rather than with the black locust with which it is often confused. The botanical name for honeylocust is Gleditsia triacanthos, Linnaeus.

Scattered throughout North and South America, southwestern Asia, China, Japan and west tropical Africa, there are about 12 species of Gleditsia. In eastern North America three species are found, the largest of which is the honeylocust. However, this tree has only a secondary value commercially.

In the honeylocust we have, in some respects, a rare tree that from May to July, depending on the location, when the leaves are nearly full grown, flowers of both sexes hang from the axils of the previous season's leaves in short, inconspicuous, greenish yellow clusters. The pollen-bearing blossoms are usually distinct from those which develop seeds, but all are on the same tree. They are fragrant and eagerly sought by bees for their nectar.

Maturing in autumn and hanging on the trees until early winter, the flat, strap-shaped, dark brown or purplish, twisted pods are a foot or more long.

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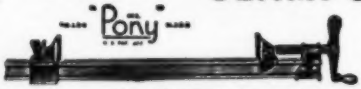

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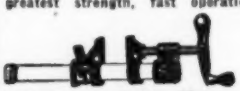

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Enclosed within the pods and separated by a sweet and succulent pulp are the numerous brown, oval, bean-like seeds. These pods are a popular food for cattle, deer, rabbits and squirrels. These animals scatter the seeds over broad areas. Bobwhite and starlings also feed on them.

The sweet pulp in the immature pod is responsible for several names in addition to the term honeylocust. These names include the honey-shuck-locust and sweet-bean tree. With maturity, the pulp becomes bitter. Trees begin to bear seed early, but seldom have large crops oftener than three to five years.

The bony coated seeds may be stored until spring. It has been found that they will sprout more readily if they are submerged in hot water to soak and cool for several hours before being planted under about half an inch of soil.

The bark is smooth and grayish brown on young trunks and branches. On mature trunks it is a quarter of an inch to three-quarters of an inch thick. The bark is divided into narrow ridges by deep, longitudinal fissures and has a tendency to peel off in strips. Relatively large, light-colored lenticels are noticeable on the smoother portions. The trunk, branches and even the zigzag branchlets often bristle with long, slender, forked thorns. These thorns were, upon occasion, used for weapons by the Indians. These grow from deep in the wood and are developments of true buds. Occasionally they put out leaves and, strangely enough, there is a variety known as inermis which grows without thorns.

The roots, which are both thick and fibrous, grow deep and wide-spread but are not like most other legumes in that they are without nitrogen-fixing nodules and add no fertility to the soil. The heartwood is either bright brown or reddish with a thin layer of pale yellow sapwood. They are hard, strong,

coarse-grained, will take a highly polished finish. If used for posts, it is quite durable even though in contact with the soil. This wood when air dry weighs about 44 pounds per cubic foot.

Black locust, among other things differs from the honeylocust in that it is two separate words. It is also called false acacia, Robinia pseudoacacia, Linnaeus and sometimes called yellow locust. It also belongs to the pea or legume family, but, different from the honeylocust, adds nitrogen to the soil.

The black locust was originally native to the Appalachian mountains, from Pennsylvania to Georgia, parts of Arkansas and Oklahoma. Its locale and choice of growth habits are the same as the honeylocust—approximately the same height and trunk diameters. The leaves, which develop in April and May, have the habit of folding up and drooping during rainy days and as evening approaches. This is one of the peculiarities of true acacias. The inner bark and roots of the trunk are said to have tonic, purgative and emetic qualities.

The perfume of the white, pea-like blossoms of the black locust is most delightful. The blossoms follow the new leaves almost immediately and cover the entire tree. From these blossoms come thin, smooth, bean-like pods which have four to eight small dark orange seeds.

Black locust is slightly heavier than honeylocust—48 pounds to the cubic foot when air dry—and is stronger and stiffer than white oak. Annually about 18,000 cords of good timber are needed to make 25,000,000 insulator pins for telephone and power transmission lines.

As mentioned in the beginning, because of its wide-spreading fibrous root system, its tendency to send up new shoots from the roots and the ability to develop nitrogen-fixing nodules on its roots, black locust is unusually well adapted to controlling soil erosion.

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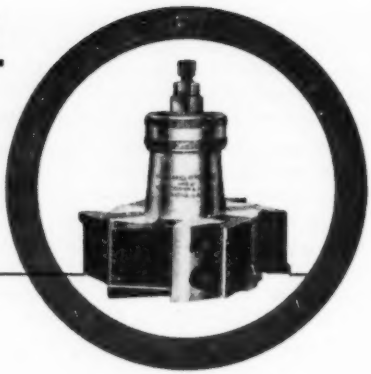

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Stay sharp longer between grinds; balanced in pairs or sets, uniform in size and temper.

Reduce ACCIDENT COSTS *Through Safe Working Conditions*

A SAFETY program, unlike a machine, cannot be installed overnight and be expected to operate day after day with little or no further attention. This is because the human element—the work habits and ideas of the workers, their cooperation or antagonism, the total of their reactions—enters into the program and plays a very important part in its success or failure.

In every plant where accidents have been reduced to a minimum, management has showed the workers that it is wholeheartedly behind the safety program and has assumed active, forceful and continuous leadership in its establishment and operation. Management has convinced the employees that it is sincere in its efforts to protect them from accidents and that it is willing to spend time and money to that end.

One of the best ways for management to gain worker interest in safety is by eliminating those hazards over which it has direct control. The realization that management is doing its part in providing safe working conditions will make the workers more receptive to a safety program. They will be more willing to do their part in maintaining safe working conditions and in supporting all phases of the safety program.

By starting work in the following areas, management can show the sincerity of its efforts to reduce accidents and can lay the groundwork for future safety activities.

1. Plant inspection. As a first step, the plant manager, accompanied by key workers, should make an initial safety inspection of the plant. Even if none of the group has had safety training, they can recognize many dangerous situations by close study of the plant and its operations. Hazards that escape detection in this survey can be discovered by experienced safety engineers or inspectors who can be brought in from the State Labor Department or from an insurance company. These safety engineers and inspectors often are asked by safety-minded managers to analyze safety conditions in the plant, make detailed safety inspections, and recommend corrective action.

Once hazards are recognized, measures can be taken to eliminate them. It is sound business practice to do so since safety and efficiency always go together.

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The process of plant inspection to eliminate hazards is a continuous one, since the old hazard may reappear or new ones may be created by a change in operating methods.

2. Planning layout and arrangement. At the time a plant is built, safe working conditions can be provided without additional difficulties or expense. Proper planning of the original plant layout and effective control of operations theoretically would eliminate all accidents. Many plants have come very near to that goal.

The need for changes in the layout or operations of an existing plant becomes apparent when materials pile up at certain points, when the paths of material in process cross each other, when employees do not have adequate working space, or when other similar conditions become apparent. These changes, particularly if they are major rearrangements in plant layout or operations, usually cost so much that another change is not practical for some time. This indicates the importance of planning all changes carefully so that new hazardous conditions are not created by the changes.

3. Housekeeping. Good housekeeping—cleanliness and orderliness—is a fundamental of good management. It prevents accidents by removing their causes. Management must take the lead in good housekeeping by proper planning of layout, space, equipment and methods, and by training and supervising the workers. When management takes an active interest in housekeeping, and insists that workers do their share, many potential accidents are averted. In a well-kept plant, there are no loose objects on stairs, floors and platforms; no articles that can fall from overhead; no wet or greasy floors; no projecting objects in aisles; and no projecting nails or sharp pieces of metal to tear the workers' hands.

4. Maintenance of plant, equipment and machinery. Without exception, in plants where accident records are good, the managers pay careful attention to maintenance of plant, equipment and machinery. Floors are kept in good condition, free of holes or splinters that might cause workers to trip or fall. All portable equipment on which men stand, such as ladders, steps, horses or scaffold planks, are maintained in first-class condition. Machine guards are properly made, installed and maintained, and the workers are instructed in their proper use. Machines, electric wiring and other equipment are kept in good condition for reasons of both production and safety.

5. Handling materials. There are several steps that management can take to prevent accidents and injuries in handling materials. It can plan and arrange operations and methods to eliminate hazardous situations and insure adequate control at all times. It can replace manual handling with mechanical handling, often cheaper and faster as well as safer. It can carefully train and adequately supervise workers to see that they move, pile or stock all supplies, products, and other materials in a safe as well as efficient manner. It can provide workers with protective clothing and equipment, such as safety shoes, goggles and gloves, on jobs where such protection is needed, and see that they make use of them.

6. Electrical hazards. Management must see to it that all workers are protected from electrical hazards. The voltages commonly used in shop lighting and power circuits have ample capacity to kill under certain conditions. Even though an electrical shock does not kill, it may lead to serious accidents. Persons receiving an unexpected shock may jump, jerk or fall, either injuring themselves or others, or causing damage to machines and products. A simple way

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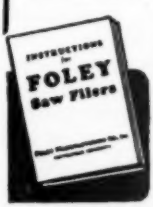

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for management to eliminate this hazard is to make sure that all circuits and lines are installed and maintained in conformance with safety standards.

7. Safeguarding machinery. The safeguarding of mechanical apparatus is of prime importance. A study of accidents in New York State during a three-year period showed that 28% of all compensated injuries in manufacturing plants were caused by machinery. Furthermore, the same study showed that injuries caused by machinery are generally more serious than injuries from other sources. More than 37% of the injuries caused by mechanical apparatus resulted in death or permanent total or partial disability.

Management must convince workers that guards should be installed on machines and used at all times. Workers who have become accustomed to working on machines without guards often resent their installation and will remove them whenever possible. These workers must be convinced that the guards are necessary for their protection. Workers who have been trained on guarded machines prefer them. It has been proved that the correct kind of guard invariably increases production by enabling workers to operate machines more steadily, or faster, or both.

Management, therefore, has the responsibility for convincing workers that guards are necessary, for installing the correct type of guard, for training the workmen in the correct use of the guarded machines, and for maintaining the guards in proper condition.

After working conditions have been made as safe as possible, management can then carry out other phases of its safety program. By that time workers will have reason to believe that management is genuinely interested in their safety and sincere in its efforts to protect them from injury.

This article has been prepared by the Safety Engineering Staff of the Bureau of Labor Standards, U. S. Department of Labor.

PENCIL MACHINERY

The S. A. Woods Machine Co., Boston 27, Mass., describes their pencil machinery in a 4-page brochure. The various steps of pencil manufacture are described from the rough pencil slat, 2 9/16" wide and 7¼" long (this will give 8 pencils); through grooving the slat on Woods machinery; gluing the two grooved slats together with leads inserted; to finishing the pencils on their shaping machine, 807M-2E.

It is claimed that with these machines and method of cutting one more pencil per slat can be produced. Both the grooving machine and shaping machine are fully explained and detailed drawings show the various parts.

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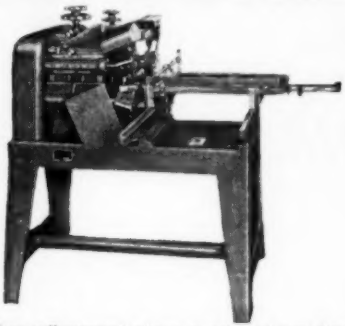

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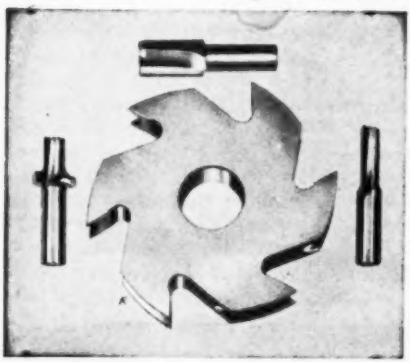

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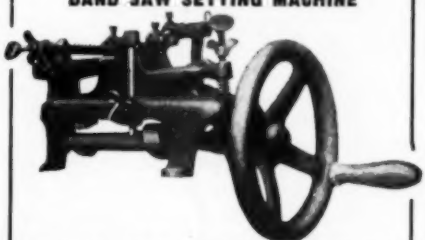

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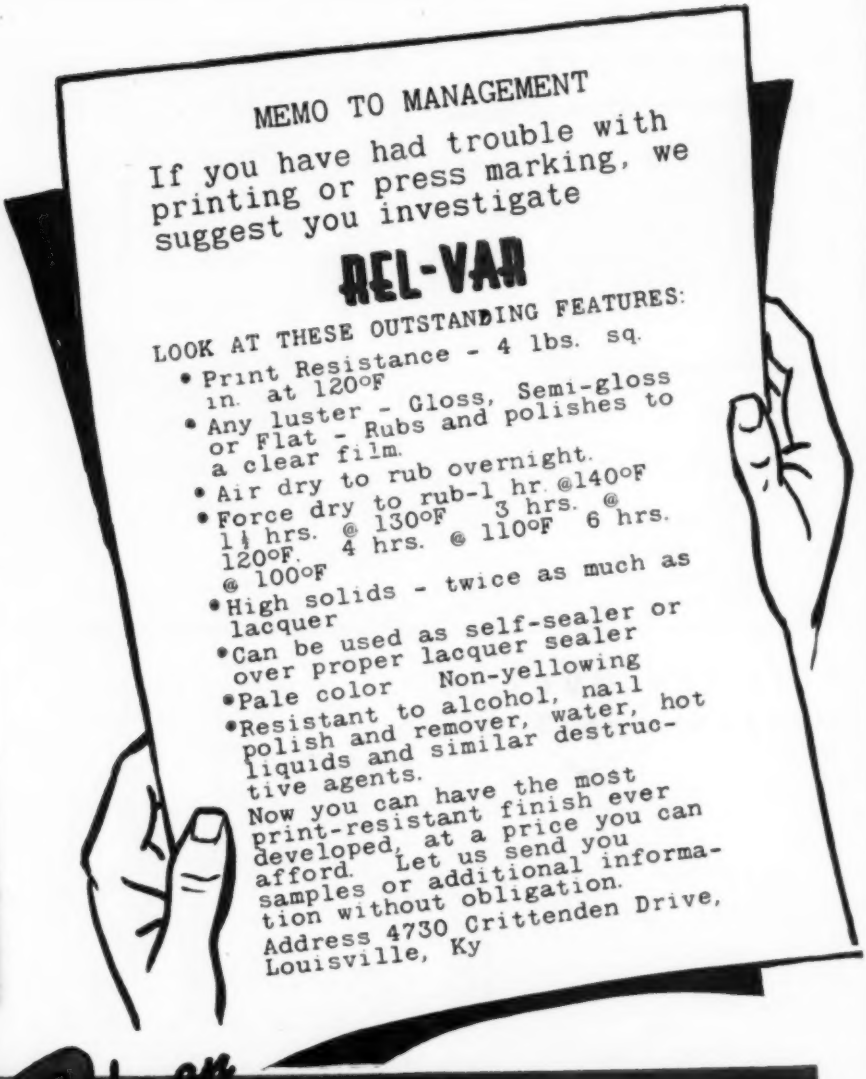
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SECTION

WOOD KITCHEN CABINET UNITS

This paper, first presented at the June meeting of the F.P.R.S., discusses typical finishing systems and finishes as used by the cabinet industry.

By D. K. Lutes

THE TREND of modern design in the American home has advanced quite rapidly within the last decade. Many of the changes in home design were initiated by the desire to promote more convenient, comfortable, and healthful living quarters for the home owner. The modern kitchen, for example, more than ever before has become a very important and desired component of the home. Many advantageous changes have been made in kitchen equipment, and this would include stoves, refrigerators, sink units, and kitchen cabinets. We could cite many advances in each of the kitchen appliances; however, for the present we shall only consider the progress in the wood kitchen cabinet field.

The wood kitchen cabinet industry has kept abreast of the changes in overall kitchen style and design. The industry has introduced new cabinet models into the field. In addition to new models there have also been some very interesting trends in finishes for kitchen cabinets. Natural wood finishes for cabinets, as an example, have become very popular since the ranch-type home has been introduced. There has also been a definite demand for pastel and solid colors on kitchen cabinets. In many cases the semi-gloss or low sheen finish has become more desired than the usual high gloss finish. On the other hand, with some cabinet suppliers, and in some areas, the gloss finish remains foremost. The selection of the proper gloss for a cabinet finish quite often depends upon the sheen of the porcelain which accompanies the ensemble, such as the sink unit, cabinet top, stove and the like.

Any company that manufactures wood kitchen cabinets realizes the im-

portance of having a durable and decorative finish for their product. Even the most expertly constructed kitchen cabinet must have a lasting and attractive finish.

At this point we shall consider some of the various finishes used in the wood kitchen cabinet field. The advantages of each finish will be included. Outlines of several typical finishing systems will enable us to closely follow the procedure used in finishing wood cabinets.

Natural Finish

Natural wood finishing is generally defined as the technique of applying transparent or translucent liquid, film forming coatings to preserve and accentuate, to the fullest extent, the grain, color, and natural beauty of the wood.

In the kitchen cabinet field the hardwoods have been used quite extensively in the natural finish line. The hardwoods are very satisfactory for this type product, since they possess natural beauty, strength, and resistance to hard usage. Those hardwoods used predominantly by the kitchen cabinet industry are: (1) maple (Acer species), (2) birch (Betula species), (3) tupelo gum (Nyssa aquatica), (4) beech (Fagus grandifolia).

In addition to the above, other woods are used; however, to a lesser degree. They are generally used for select and custom built cabinets, and may include such hardwoods as: (1) mahogany (Swietenia species), (2) walnut (Juglans nigra), (3) oak (Quercus species).

The finishing of wood cabinets with a natural or clear finish can be quite complex. The complete operation often requires the use of many finishing products and entails several distinct finishing stages. I refer here to such necessary procedures as staining, wash coating, filling, sealing, finishing, rubbing, and polishing. In order to understand the complete finishing cycle, it will be necessary to briefly consider each operation, with its related product individually.

Staining

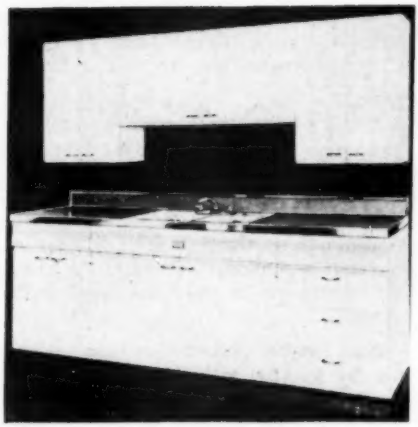
Staining is the application of coloring matter to wood surfaces. Stains consist of transparent or semi-transparent colors, generally natural or synthetic dyestuffs or pigments, suspended in a solution of volatile liquids. The function of a stain is to impart color to the wood surface without obscuring the grain or pattern detail. Stains also tend to even up color differences in the wood thereby giving the cabinet a uniform overall tone.

Stains are of several types, and the selection of the proper stain for a given finish depends on careful consideration of several variables. These are: (1) type of wood to be stained; (2) whether light, medium or dark finish is desired; (3) type finishing schedule planned; (4) method of application—dip, brush, spray, wipe or non-wipe; (5) quality of complete finish desired—medium or high grade; (6) durability required—as resistance to fading, color retention, etc.

For simplicity and convenience, wood stains have been classified on the basis of the liquid or solvent in which the coloring matter is dissolved. The major groups are: (1) water soluble stains; (2) penetrating oil stains; (3) pigmented wiping stains; (4) spirit-soluble stains; (5) non-grain-raising stains; (6) specialty stains, sapwood stains, trim stains, etc.

Only two of the above mentioned stain groups are generally used for kitchen cabinet finishing. They are the pigmented wiping stains and the non-grain-raising stains.

Good stains should, as nearly as possible, approach the following desired characteristics: (1) do not raise grain of wood (this property is not always achieved—example, water stains and



Courtesy, The Mengel Company.

This is the Mengel Royal-wood line. The company furnishes the units in white or four decorator colors with Micarta or Armstrong linoleum counter tops.

spirit stains); (2) provide uniform staining effect; (3) do not bleed into succeeding coating materials; (4) should classify as fast-to-light; (5) dry rapidly.

Fillers and Filling

Filling is often referred to as "the foundation of a fine finish." With certain large-pore, or open-grain woods as mahogany, walnut, and oak, filling is a necessary step toward building a lustrous, durable, natural finish. Many close-grain woods such as birch, beech, and maple are frequently finished without the use of a filler. In some cases, however, a filler is employed to close grain wood before finishing simply to equalize the absorption of the different surface areas. Very often the pigmented wiping stains have sufficient filling properties for close-grain wood. If a pigmented stain is used, a conventional type filler is not required.

The main function of a filler is to fill open pores, thereby eliminating grain depressions. A filler also prevents subsequent varnish or lacquer top coats from being absorbed by the wood. Quite often a filler is used to impart color to the pores, and thereby accentuate the grain.

Wood fillers fall into two general groups: paste fillers and semi-paste fillers.

Semi-paste fillers are the most widely used in present day finishing. A typical semi-paste filler is composed of the following ingredients:

1. Non-absorbent, colorless, inert pigments as silica (silex), calcium sulfate (gypsum), and asbestine.
   a. Color pigments such as umbers and siennas (in some types).
2. Non-volatile vehicle, generally raw or boiled linseed oil which serves as a binder. Rapid drying types contain specially processed oils or vehicles.
3. Suitable metallic driers, such as lead, manganese and cobalt naphthenates.
4. Solvent.

As a rule it is necessary to impart some color to fillers. This is accomplished by incorporating earth color pigments such as the umbers and the siennas. High grade, fast-to-light lake colors are used in many fillers in order to achieve a desired color tone. The selected color of the filler will, of course, depend upon the type of wood being finished and the degree of grain contrast desired in the final finish. In general, the color of the filler in the pore should be slightly darker than the rest of the wood. If the color of the filler is close to or lighter than the wood, a hazy appearance due to gray pores may result in the final finish. A filler which is light in color is, at times, used in some modern finishes to achieve a blond or bleached effect when the final finish is being applied.

In a conveyorized finishing plant, it is customary to apply the filler by spray application. Naphtha or lead-free gasoline may be used to adjust the filler to spraying consistency. In some finishing plants the filler is applied by brush. When applied to the surface the filler is allowed to dry for a period of two to four minutes. At this point the filler begins to harden slightly and takes on a dull or flat appearance. As soon as the filler has become dull, the surplus is removed by a combined padding and wiping operation. This tends to pack the filler well into the pores. Cotton cloth, waste, jute, tow, hemp or burlap are preferred for the wiping operation. The usual practice is to pad in and wipe across the grain, followed by a light wiping with the grain to remove streaks.

The filler usually dries overnight; however, special fast drying four-hour fillers or one-hour baking fillers have been used with considerable success on fast production schedules. If proper drying of the filler is not achieved there may be swelling in the pores due to absorption of the solvent present in the subsequent sealing coat. Improper drying is often the cause of the filler graying in the pores of the wood.

Sealers and Sealing Operations

Sealers fall into three broad classes: (1) lacquer sealers (fast drying); (2) shellac sealers (fast drying); (3) varnish sealers (slower drying).

The main function of a sealer, as the name implies, is to seal the surface of the wood, thereby preventing the absorption of succeeding finish coats.

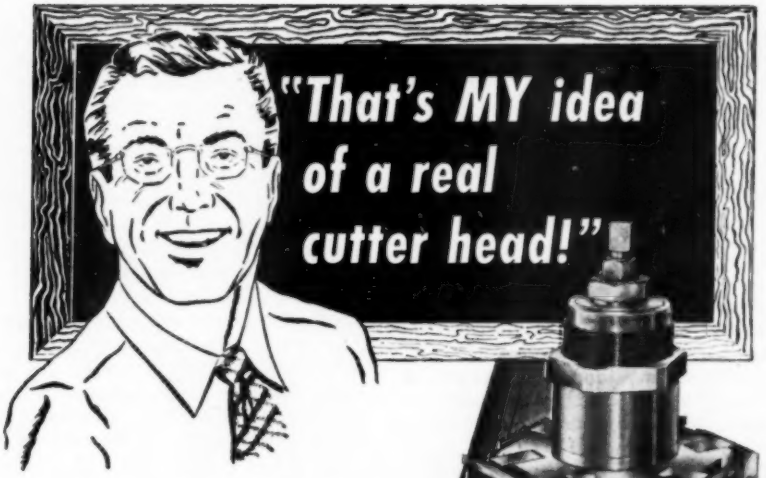
All wood, whether open-grained or close-grained, is porous. If the surface is not sealed, some penetration and absorption of the final finish coat is inevitable. Other valuable functions of the sealers are: (1) seal in the filler; (2) blend or moderate the stain; (3) expedite sanding or stiffening any raised grain or minute wood fibers; (4) form a bond between the wood and finish coat.

Of the various type sealers, the lacquers are the most popular. Lacquer sealers are almost always applied by spray application. A wet, even coat should be applied, but the surface should not be flooded. If too heavy a seal coat is applied, swelling of the filler and brittleness in the final finish may result.

Most lacquer and shellac type sealers are dry to sand within thirty minutes to one hour. Varnish type sealers, which of course dry more slowly, generally require overnight to dry before sanding. In some finishing plants varnish sealers are force-dried for two to three hours at 130° F.

When the sealer coat has dried hard, it should be dry-sanded. Usually 5/0 to 7/0 abrasive paper is used. Either manual or automatic sanding is acceptable; however, care should be taken to prevent excessive sanding which would cut through and destroy film continuity. If the sealing film is broken the sanding operation will strike the stain coat. This will result in poor color effect in the final finish. After the sanding operation, the dust should be blown off and the surface wiped with a tack rag. The surface is now adequately prepared to receive the final finish.

Before leaving the subject of sealers, we should mention the operation of wash coating. Wash coating is actually a slight sealing operation which is sometimes included with the finishing cycle. A wash coat is merely a shellac or lacquer sealer thinned to low solids and low viscosity. The wash coat precedes the filling operation, and its main function is to aid sanding prior to filling. A wash coat enables the filler to be removed with greater ease. Application is by spray.



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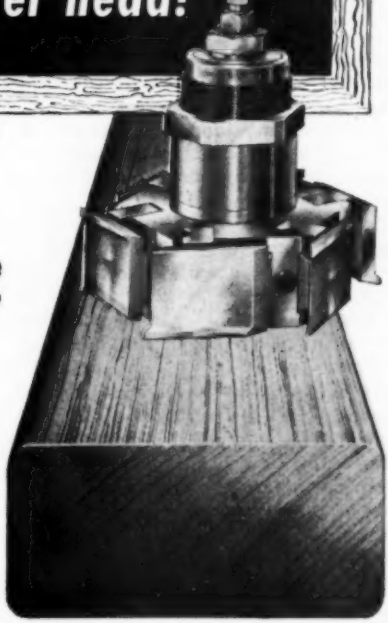

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Finish Coat

The final clear finish used on the kitchen cabinets will generally fall into one of the following groups: (1) lacquers, (2) varnishes, (3) synthetic finishes.

Lacquers

Lacquers are coating materials which contain an appreciable quantity of nitrocellulose modified with natural or synthetic resins and plasticisers. A properly balanced mixture of volatile solvents provides rapid drying by evaporation resulting in a clear, hard, durable film. There are, of course, several types of lacquers used for cabinet finishing. The most prominent types are: (1) clear gloss rubbing and polishing lacquers; (2) clear flat or rubbed-effect lacquers.

The selection of any given lacquer depends upon the ultimate finish desired; that is, whether it is to be a high gloss, semi-gloss, flat or rubbed-effect finish. Lacquers are widely used because they dry rapidly, and thereby conform to fast moving production schedules.

When lacquers are used as the final finish either one or two coats may be applied. Generally, if a gloss finish is desired two coats of a gloss lacquer are applied, with approximately a one or two hour drying period between coats. If a flat or semi-gloss finish is desired one coat of lacquer will often suffice.

Varnishes

Varnishes are clear coatings consisting of natural gums or synthetic hard resins dissolved in one of several type oils such as linseed oil, soya oil, tung oil, or dehydrated castor oil. These resin solutions are further thinned down with various solvents such as turpentine, naphtha and alcohol.

Within the last 20 years varnish making has literally changed from an art to a highly technical science. The old type oleoresinous varnishes containing fossil gums in an oil have been replaced by more complex synthetic resin-in-oil combinations. Many natural fossil resins as kauri, amber, copal, and damar have been replaced, to a large degree, by synthetic resins as ester gum, phenolics, coumarone indene, and many others too numerous to mention.

An oil varnish contains drying or semi-drying oils which dry and harden by oxidation. The varnishes are generally charged with small quantities of metallic driers, as lead, manganese, and cobalt naphthenate to facilitate drying.

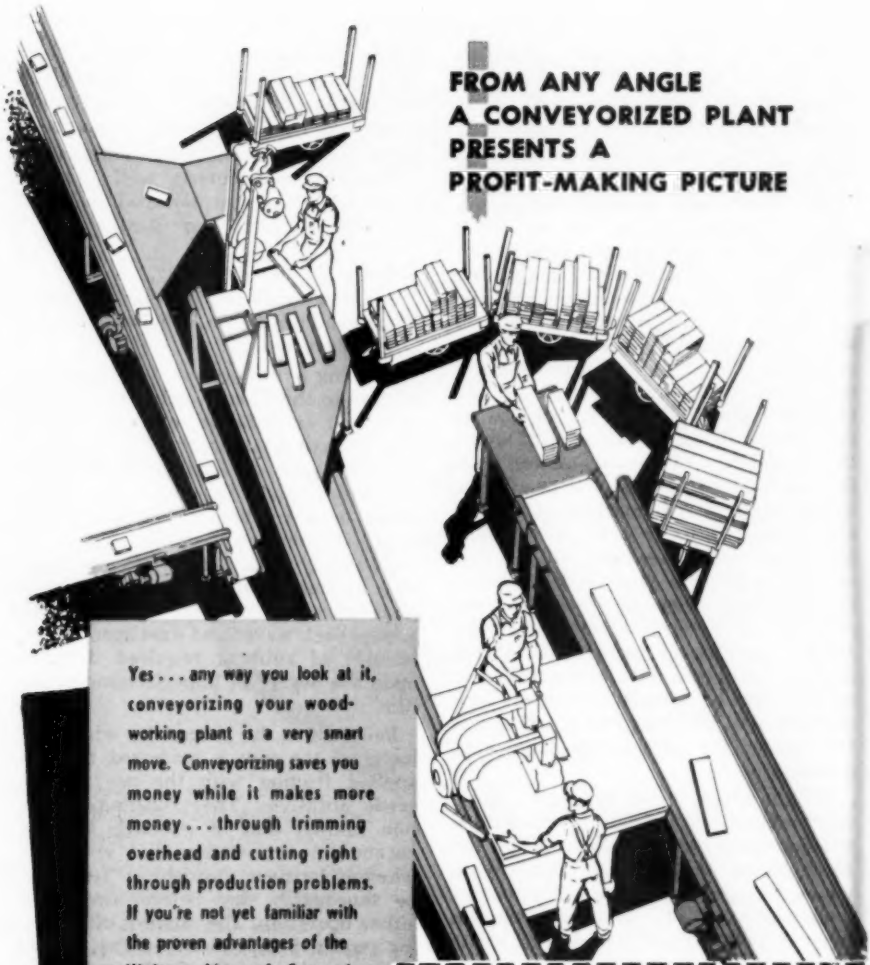
There are many types of varnishes, and this can be emphasized by the fact that it is common for a large paint manufacturing company to carry as many as 150 to 200 varnishes.

There are some varnishes which are used by the cabinet industry. These would include the quick setting, hard drying, short-to-medium-oil-length varnishes. Some rubbing varnishes are used. The varnishes are not used as widely in production as lacquers because they dry much more slowly. The slow drying typical of varnishes tends to retard production finishing, and also usually results in a dirt problem in the final product. The slightest amount of dirt in the finishing plant will adhere to the slow drying varnish film. The varnishes do not fit too well into the fast, present-day production schedules.

Varnishes do have advantages, however, since they provide a depth in appearance and build-of-film which is not always possible to achieve with lacquers.

Clear Synthetic Finishes

Clear synthetic finishes must be differentiated from varnishes even though the two terms are quite often used interchangeably. A synthetic resin finish



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is actually a product which is born in the chemist's test tube. There are many classes of synthetic resins, and these include phenolics, urea-formaldehyde resins, vinyl resins, alkyd resins and others.

The alkyd resin coatings comprise a very important group of synthetic resins. Alkyds are reaction products of a polyhydric alcohol, such as glycerol, and a polybasic acid, such as phthalic anhydride in the presence of an oil such as linseed oil, soya oil, castor oil or others. The major characteristics of the alkyd resin are imparted by the type of modifying oil used, and also by the degree of oil modification. During the reaction a complex molecule is formed by a combined process of condensation and polymerization. There are, of course, many different types of synthetic resins; however, only a few specific types, for clear type coatings, are applicable to wood cabinet finishing. Alkyds are used rather widely as the vehicle portion of pigmented cabinet finishes, as in primers and enamels. The specific use of alkyds in primers and enamels will be presented more in detail under the section on pigmented coatings.

Within recent years low-bake, clear, synthetic cabinet finishes have been developed and used successfully in the field. These finishes are alkyd types which are modified with urea-formaldehyde resins. They generally contain from 40 to 50 percent non-volatile solids and are supplied at ready-to-spray viscosity. In order to obtain proper drying under the low-bake schedule, this type finish is further modified with an accelerator just prior to use. An excellent finish having good build, luster, and depth in appearance is produced when the finish is force-dried for three hours at 130° F. to 140° F.

From a quality standpoint, the heat converting urea-alkyd type coatings are equal or better in general durability and hardness than a high grade lacquer. They are definitely superior to lacquers in resistance to alcohol, food stains, nail polish remover, and similar reagents.

The synthetic heat-converting type coatings are particularly well adapted to conveyorized operations where suitable baking facilities are present.

Rubbing and Polishing

The final touch to a fine natural finish is achieved through rubbing and polishing procedures.

Rubbing is the procedure of applying friction to the film, usually in conjunction with an abrasive and a lubricant. The abrasives used for the rubbing operation may include such materials as pumice, diatomaceous silica, rotten stone, or a combination of these materials. A thin petroleum base oil is the most widely used lubricant for the rubbing operation. Rubbing eliminates small imperfections in the film such as orange peel, waves and dust specks. The amount of rubbing required depends upon the degree of imperfections in the film.

Polishing is the process by which the luster of the film is increased through applied friction with the use of fine grade abrasives. The polishing operation follows that of rubbing. It is of paramount importance that any film, whether lacquer, varnish, or synthetic, be thoroughly dry before attempting either operation. The amount of polishing required depends upon the desired sheen or gloss in the final product.

We have rather completely reviewed the necessary procedures in preparing a natural wood finish for cabinets. Before going on to our next phase of finishing; namely, pigmented coatings, it would perhaps be wise to outline one or two complete natural finishing systems typical to the wood kitchen cabinet industry.

Representative finishing schedule for a close-grain wood such as maple:

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1. Preparatory sanding of wood using 5/0 or 6/0 sandpaper.
2. Removal of sanding dust — air blast.
3. Apply non-grain-raising stain—dry one hour.
4. Spray lacquer sealer. Dry 30 minutes to one hour.
5. Sand with 6/0 or 7/0 sandpaper.
6. Remove sanding dust—air blast—tack rag.
7. Spray coat—rubbing and polishing lacquer. Dry one to two hours.
8. Spray second coat—rubbing and polishing lacquer. Dry overnight.
9. Rub finish completely.
10. Remove rubbing mixture from surface.
11. Polish to desired sheen.

Variations of the above system may be found. A varnish or a synthetic clear topcoat could be used in place of a lacquer. It is important to note that the close-grain maple did not require either a washcoat or the use of a filler.

Representative finishing schedule for an open-grain wood such as oak.

1. Preparatory sanding of wood using 5/0 or 6/0 sandpaper.
2. Removal of sanding dust — air blast.
3. Apply stain, if required—dry one hour.
4. Spray lacquer washcoat—dry 30 minutes. Sand.
5. Apply filler, set, pad in and wipe.
6. Allow filler to dry: four hours to overnight (depending on type).
7. Spray lacquer sealer coat. Dry 30 minutes to one hour.
8. Sand with 7/0 sandpaper.
9. Remove sanding dust—air blast and tack rag.
10. Spray coat—rubbing and polishing lacquer. Dry one to two hours.
11. Spray second coat—rubbing and polishing lacquer. Dry overnight.
12. Rub finish completely.
13. Remove rubbing mixture from surface.
14. Polish to desired sheen.

"Raising prices must be like gambling—it gets in your blood."

The above finishing schedule for oak is somewhat more complex than the previous schedule outlined for maple.

Since oak has large open pores, it was necessary to incorporate two additional operations into the schedule; that of washcoating and filling. Open-grain woods require a greater amount of preparation for the final finish than the close-grain woods. In the above schedule more than one coat of lacquer finish coat could be used. It would also be possible, as in the case of the maple finish, to use varnish or a synthetic type topcoat instead of lacquer.

Pigmented Coatings

Our next phase of kitchen cabinet finishing will deal with the pigmented coatings. The enameled kitchen cabinet ensemble is still foremost in demand, even though the natural finishes have become quite popular.

Kitchen cabinets which are to be finished with pigmented primers and enamels are usually constructed of the softer, small-pored, lower cost woods. Those most widely used throughout the

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industry are fir, spruce, yellow pine, and white pine.

Some kitchen cabinet manufacturers use hardwood veneer types, such as gum, birch, or beech veneer with a poplar (Populus) core. All the above mentioned woods are very satisfactory for cabinets which are to be finished with a primer and enamel system.

Prior to the application of the primer or undercoater, the cabinet is thoroughly sanded. The amount of sanding required depends upon the type of wood being used and also the condition of the wood. Usually two operations are required, rough sanding and finish or fine sanding. In some plants the component parts of the cabinet are rough sanded prior to assembly. The complete cabinet is then sanded with a fine grit paper. Many types of automatic sanders are employed in production. Those most widely used are: belt sanders, drum sanders, pneumatic hand sanders and electrical hand sanders.

When the sanding has been completed, the dust is blown off with an air blast. The equipment used for this operation is commonly referred to as an air duster.

Wood Primers

Wood primers are also known throughout the industry as enamel undercoaters. Cabinet primers are highly pigmented, and as a rule contain 50 to 60 percent pigment by weight. Thirty percent of the total pigment is composed of hiding pigments such as titanium dioxide and lithapone. Approximately 60 to 70 percent of the total pigment weight is usually made up of extenders or inert pigments such as magnesium silicate and calcium carbonate. The inert pigments have a very important role in the primer, for the proper selection and balance of inert pigments control important primer characteristics such as sanding ease, intercoat adhesion with enamels, and holdout of the enamel.

The vehicle portion of the primer formulation usually consists of a medium-oil-length varnish. Often the vehicles used are resin modified to promote faster drying and ultimate film hardness. Short-to-medium-oil-length alkyds are also used. The primer formulation also contains metallic driers which tend to expedite oxidation of the oils in the varnish thereby promoting drying of the film.

The primer is applied by spray application and allowed to dry overnight. Many modern finishing plants use large drying rooms or ovens to force-dry the prime coat. The temperature of the drying room will range from 120° F. to 130° F., and the time required to achieve complete drying of the primer at this temperature may be from two to three hours.

The desirable properties of a cabinet primer are: (1) ease of application; (2) good leveling on work; (3) fast drying; (4) easy sanding; (5) have good adhesion to wood; (6) have good sealing or enamel hold-out; (7) provide good intercoat adhesion with enamel topcoat.

Although most cabinet finishing plants use only one coat of primer, it is not uncommon for some to apply two coats. Using two coats of primer has advantages since the first coat will satisfy the absorption of the wood and the second coat tends to build a smooth foundation for the enamel topcoat. Adequate drying time between each coat is, of course, essential. The general practice is to sand each primer coat.

When the primer has been thoroughly sanded and the sanding dust removed by an air duster, the cabinet is ready for the enamel coat. At times some repair work may be necessary before applying the final coat. This would include small scratches, indentations and mars which the cabinet may have acquired on a finishing line. The inspection department generally segregates

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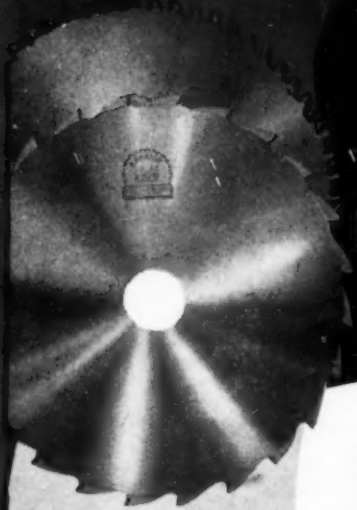

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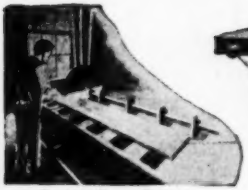

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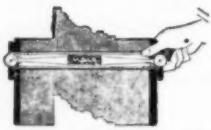


Reproducing Template

Universal Vise

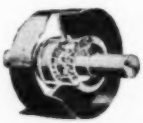
Lumber Gauge

Planer Bolts

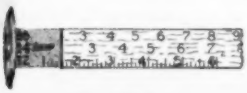
Factory Truck

Moisture Meter

Quick Acting Vise



Ball Bearing Loose Pulleys



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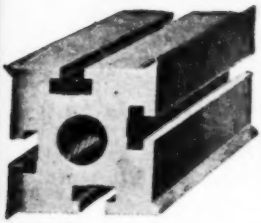
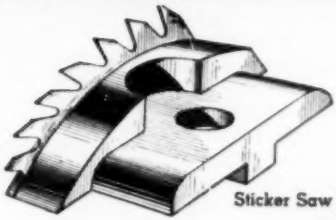
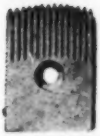

Sticker Head


Sticker Saw Heads


Tenoning Spurs

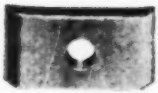
Sticker Springs

Shaper Knife

Matcher Bits

Sticker Posts

Balance Scale


Sticker Caps

Molders Gauge

Milled Knives

Coping Knives

Moulding Knives

Planer Knives

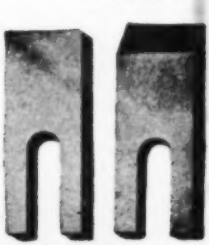
Thin Knives

Shaper Steel

Steel Rolls

Tenoning Knives

Rabbet Blanks


Blanks

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those cabinets having imperfections which would show through the enamel coat.

A highly pigmented, fast-drying wood putty is recommended for surface repair. The pigment portion of a suitable wood putty would be quite like that of the primer. A high percentage of the total pigment is made up of inert extenders such as magnesium silicate and calcium carbonate. The vehicle portion may be either varnish or lacquer. It is important that a putty used for surface repair sand easily and have good enamel hold-out. A well formulated wood putty will not shrink upon drying. A putty which does shrink and crack during drying or shortly thereafter causes considerable trouble in that it usually necessitates subsequent repair work on the finishing line.

The use of wood flour for minor surface repair has also been employed by some finishing plants. Wood flour is made of fine powdered wood dust or sanding dust. The wood is collected and then sifted to eliminate the coarse particles. The wood paste filler is made by mixing the wood flour with water and then adding a small amount of quick drying cabinet glue. The glue serves as a binder. Either casein glue or a good synthetic resin glue is recommended for the binder portion. One can compare wood flour repair paste to the rather widely known product, plastic wood. Plastic wood is merely wood flour mixed with a nitrocellulose base which promotes rapid drying and serves as a binder. Plastic wood is also quite often used for surface repair and patch-up work.

At this point I would like to mention pigmented lacquer primers. The lacquer primers have an advantage over the synthetic type because they dry very rapidly. This aspect, of course, is important from a production finishing standpoint since considerable time would be saved through their use. Lacquer primers can be recoated with enamel within one or two hours. They provide excellent enamel hold-out. In spite of the advantages of a lacquer primer from a production standpoint, care must be taken when they are considered for use with a synthetic enamel topcoat. Experience in the field, as well as laboratory test work, has indicated intercoat adhesion failure upon aging. The lacquer-synthetic system in addition, quite often displays poor resistance to high humidity conditions resulting in film failure in the form of blistering and crazing.

Enamel Finish

Around 1930 a very significant advancement was made in the paint industry. At this time a completely new type enamel was made possible through the introduction of alkyd resins. Prior to 1930 the best white enamel finish was produced with either pigmented lacquer or pigmented damar varnish. The new alkyd type enamels became extremely popular, since they possessed several advantages over the lacquer and the damar-type enamels.

The alkyd enamels had an advantage over lacquers in that they had higher solids at spraying viscosity. One or two coats of an alkyd enamel would have the same build-of-film as provided by four coats of lacquer. This, of course, placed the alkyd enamels at a decided advantage cost-wise, for they were considerably more economical to use than lacquers. The alkyd enamels provided greater durability than the lacquers. The new type finish had greater flexibility than the lacquers, and therefore excelled in resistance to chipping and crazing. The lacquers, however, still held the advantage of drying faster than the alkyd materials.

The progress made with alkyd enamels actually brought about a marked transition in the product finishing field. By 1935 the use of alkyd enamels re-

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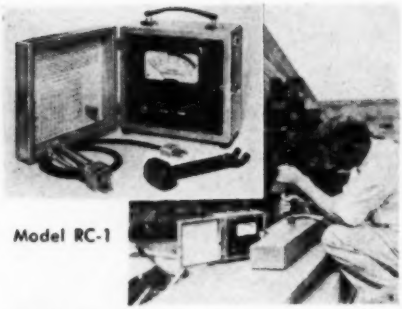

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placed lacquer finishes on many commodities. Prior to the introduction of alkyds, for example, household refrigerators were finished with lacquers. This industry rapidly adopted the use of the alkyd enamel finish. The wood kitchen cabinet industry also found the alkyd finish had merit, and accepted it in place of lacquer. To this day the leading manufacturers of wood kitchen units are using alkyd enamel finishes. It is true that some of the smaller wood cabinet manufacturers may still use lacquer materials. The smaller organizations have limited plant area and require the faster drying lacquer materials. Although the alkyd enamels became exceedingly popular, they did not spell complete doom to the lacquer phase of the coating industry. The advent of the alkyd resins actually did provide new opportunities in lacquer formulation. It was discovered that lacquers could be modified with certain alkyds and various film characteristics achieved. Many of our most durable and high grade lacquers today are alkyd modified types.

Alkyd enamels have been used for many years in finishing kitchen cabinets, yet definite and continual progress has been made toward improving this type of finish. Improved alkyds have made possible the development of enamels which dry faster and have greater color retention than those used previously. Improvements in white pigments such as titanium dioxide have also contributed a great deal toward the development of higher quality synthetic enamels.

A high quality cabinet enamel is usually formulated with a good color retentive glyceryl phthalate alkyd of medium oil length. The pigment portion, in the case of a white enamel, would consist of a high grade titanium dioxide. The enamels are designed to dry as rapidly as possible; however, actual overnight drying is generally

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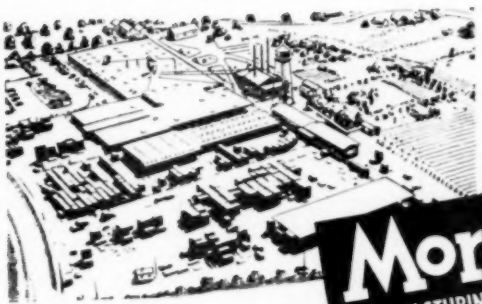

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necessary unless some facilities are available to force-dry the finish. Many finishing plants force-dry the enamel coat for a two or three hour period at 130° F.

The degree of gloss or sheen desired in the enamel coat may vary from one cabinet manufacturer to another. Some concerns desire a high gloss enamel while others finish their cabinets with a semi-gloss or even a low-gloss enamel. The paint supplier can adjust the enamel to any desired sheen by incorporating inert pigments into the formulation.

Modern kitchen design along with various trends in interior decorating has brought a demand for special colors on kitchen cabinet units. Up to a few years ago almost all kitchen cabinet units were painted white. The white enameled cabinets are still popular. However, through demand many manufacturers have added various colors to their cabinet line. At the present time it is not uncommon to find as many as 16 colors carried by certain large cabinet concerns. The colors may range from various pastel shades of blue and green, to deep shades of blue, red, green and maroon. Colorful kitchens are in style today, and some beautiful combinations are possible by using cabinet units which are in color contrast with the walls, floor, curtains and other kitchen appointments.

In the development of the special color enamels it is of paramount importance to use only high-quality pigments. The pigments must have good fade resistance, and must not stain or bleach out when in contact with the usual household reagents as soap, fruit juices, cooking grease and others.

At this point it would be well to outline the desirable properties of a cabinet enamel. They are: (1) ease of application; (2) proper hiding; (3) fast drying; (4) proper gloss, full-, semi-, or

low-; (5) good adhesion to primer, (6) adequate film hardness; (7) good mar resistance; (8) non-yellowing if white enamel, fade resistant if in color; (9) have good abrasion resistance; (10) have good resistance to fruit juices, cooking grease, soap, and other household fluids (must not stain or bleach); (11) withstand frequent washing with soap and water and retain film properties.

The straight alkyd type enamels have been used very successfully for the finishing of kitchen cabinet units. The development of more durable enamels is possible, however, by modifying the alkyd with urea-formaldehyde or melamine resins. This type finish will closely parallel the low-bake, clear finish described previously under the heading "Clear Synthetic Finishes." The urea or melamine alkyd enamels are heat converting type coatings and require a temperature of 130° F. to 140° F. for a three hour period to achieve complete drying. The enamel is modified with a small percentage of an acid type accelerator just prior to use. The accelerator is necessary to effect proper drying of the film.

At the present time the urea modified low-bake enamels are not widely used in production, since they require adequate baking facilities and some special handling before using, such as the addition of an accelerator. This finish is also comparatively new to the field, and at the present time is still in the experimental stage. The urea modified enamel is considerably higher in cost than the conventional alkyd enamel, and this factor has also curtailed extensive utilization in the field. It is conceivable that the urea-alkyd enamel finish will eventually gain recognition and become more widely used for finishing wood kitchen cabinets. This same finish has been used for many years in the finishing of metal refrigerators, metal cabinets, washing

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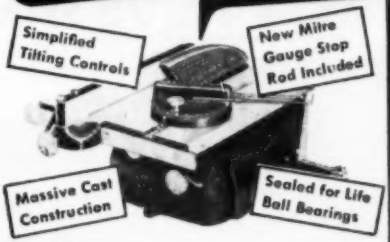
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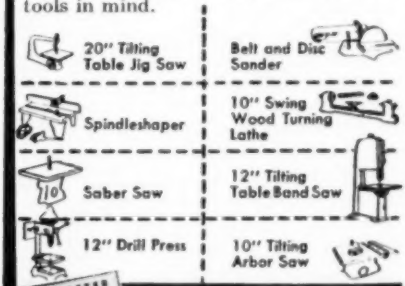

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machines and other appliances. When finishing metal products the enamel is generally baked at 300° F. and therefore does not require additional accelerator. It is not possible, of course, to successfully use this high temperature when finishing wood cabinets. The urea modified enamel finish surpasses the conventional alkyd finish in several properties. Some of the advantages are: greater ultimate film hardness with satisfactory adhesion and flexibility, extremely high gloss (if desired) and mirror-like clarity of film, superior non-yellowing and color retentive properties, superior abrasion resistance, greater resistance to repeated washing, superior resistance to fruit juices, cooking grease, alcohol, nail polish remover, vinegar and other household fluids.

We have reviewed, quite thoroughly, the products required to obtain a satisfactory enamel finish on wood kitchen cabinets. This included a description of such products as primers, repair putty and enamels. Now that we have a better understanding as to the nature, and the function of each finishing product, we can outline a typical finishing system employing their use. A representative production finishing schedule follows:

1. Preparatory sanding of wood (employing either belt sanders, drum sanders, pneumatic sanders, etc).
2. Removal of sanding dust—air duster.
3. Spray application of primer coat. Force-dry three hours at 130° F.
4. Sand primer—6/0 to 7/0 sandpaper.
5. Removal of sanding dust—air duster.
6. Surface repair with putty if required—adequate drying period—sand repaired areas.
7. Final air dusting and tack rag.
8. Spray application of enamel coat. Force-dry three hours at 130° F.

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The above system will vary for, as explained previously, two coats of primer are often used. Some finishing plants have also made use of an intermediate coat which is prepared by blending equal portions of the primer and enamel. This intermediate coat very often provides a good surface for the final enamel coat, providing the primer and enamel are compatible and capable of being blended. Generally this practice is not recommended unless previously tested by the paint supplier and found to be sound from a quality standpoint.

Recommended Pre-finishing Treatment for Wood

Throughout the presentation I have outlined several complete finishing systems using both clear and pigmented coatings. An additional step should be included in each finishing schedule if we want to achieve maximum film durability. A pre-finishing treatment of the wood with a deep penetrating liquid sealer is highly recommended. This type liquid sealer is formulated to provide maximum moisture control to the wood. I did not mention this pre-finishing treatment originally, since the finishing systems outlined were to represent those actually used in the field. Unfortunately, the moisture control sealers (M.C.S.) have not been used extensively in the cabinet finishing field. The cabinet industry, as well as the entire furniture industry, has been reluctant to accept the use of this important product. The main objection to using the sealer is that it introduces another step to the finishing cycle. The use of moisture-control sealers does not replace the use of the conventional sealer when preparing a natural finish. The M.C.S. provides a deep sealing operation, whereas the conventional sealer is designed to provide surface

sealing. The M.C.S. does not provide good hold-out to subsequent finish coats, and therefore the conventional sealer must also be used.

The moisture-control sealers are special synthetic liquid preparations of low solids and low viscosity. The sealer is water thin, and is applied by dip application. The wood is generally dipped into the sealer after the sanding operation. The sealer is designed to provide rapid and deep penetration into the wood pores. A 16-hour drying period is generally required. The grain of the wood is not raised by the sealer. This product can be used with either pigmented or clear lacquer or synthetic finishes.

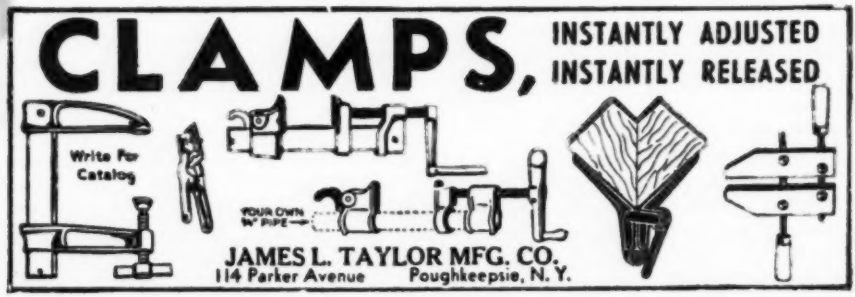
What are the advantages of the liquid sealer? We have used the term "moisture-control" in describing the sealer, and that precisely implies its main function. The M.C.S. provides a barrier which retards the movement of moisture into the wood. All finishes, whether on kitchen cabinets or other type furniture, are permeable to atmospheric moisture. The film may appear to have flawless continuity, yet some moisture will migrate through the film and into the untreated wood.

The movement and the penetration of the moisture will, of course, be influenced by variations in atmospheric pressure, humidity and temperature. One can readily understand that the wood will take up considerable moisture unless it has been protected with a penetrating sealer. If, for example, the wood has not been treated it will continue to absorb any amount of moisture passing through the film. The trapped moisture under the finish can bring about numerous film failures such as blistering, loss of adhesion and checking.

The expansion and contraction of wood under various atmospheric conditions is influenced by the moisture content. A high moisture content causes excessive contraction and expansion under temperature changes, and results in poor dimensional stability of the wood. It is very obvious that poor dimensional stability of the wood will, in turn, cause early failure of the finish coat in the form of checking and crazing. Pre-treating the wood for moisture control is a progressive step toward increasing the durability of a cabinet finish.

Advance of Modern Finish Technology

As the wood kitchen cabinet industry advances, new demands may be placed upon the paint supplier. Improved and more durable protective and decorative facilities of the paint industry and related chemical industries are continually developing new resins, pigments and other products which are ultimately used to formulate more du-



rable coatings. There have been many technical and manufacturing advancements in the paint industry which make possible the production of improved coating materials. Some of the most important advancements are: (1) the use of modern paint manufacturing equipment; (2) new or improved paint testing instruments and equipment; (3) improved methods of paint evaluation and testing; (4) greater availability of paint technological literature; (5) production quality control; (6) highly trained personnel.

The development of high quality coatings is not the only achievement which has contributed to the successful finishing of wood kitchen cabinets. Other divisions of the product-finishing field have also made considerable progress and deserve recognition. Before concluding this presentation, I would like to outline a few of the other advancements which are instrumental to the successful finishing of kitchen cabinets. They are: (1) improved plant layout; (2) conveyorized production lines; (3) humidity control—finishing plant; (4) improved drying ovens; (5) high-speed sanding equipment; (6) improved spraying equipment and methods.

The End

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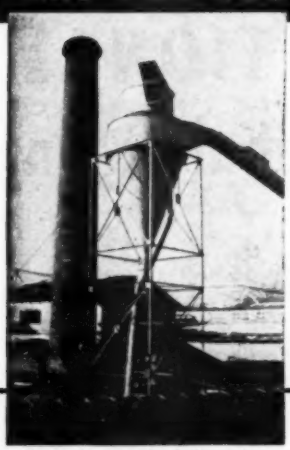

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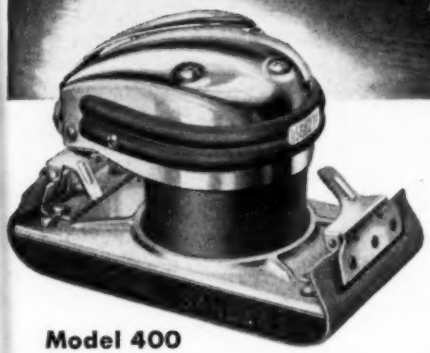

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Webbing is inserted through slots and looped back over itself . . . this adaptation of the simple but effective "luggage strap" principle ensures positive grip without danger of slippage.

One end is attached by positioning clip so that drawn stud locks in hole bored in tubing. Process is repeated at other end of webbing, using simple hand tool for leverage.

Result . . .

Webbing seats and backs are tight and smooth.

Webbing is firmly anchored both ends, not weakened by screws.

Seats and backs are as easy to take apart as they are to put together.

No special skill required.

UNITED-CARR FASTENER CORP.

31 Ames Street, Cambridge 42, Mass.

MAKERS OF **DOT** *FASTENERS*

APPOINTMENTS

The Continental Screw Company of New Bedford, Massachusetts has announced appointments for several of their men. **Harvey F. Phipard, Jr.**, is now director of research and engineering. Position of chief engineer is being filled by **Edward J. Locke, Jr.**, and **George E. Jenney, Jr.**, is now master mechanic.

O. V. Slaughter is the new sales manager for the Mansfield Hardwood Lumber Co. of Shreveport, La. This company produces Louisiana pine and hardwood lumber.

Morgan Manufacturing Company, Black Mountain, N. C. has two new sales representatives. In the Chicago area they have **M. H. Kruissink**, 2334 S. La Salle St. **J. I. Rucker**, 1104 Deposit Guaranty Bank Bldg., Jackson, Miss., will represent Morgan in Indiana, Kentucky, and other southern states.

Augustine R. Marusi has been appointed vice-president in charge of development of the Borden Company's Chemical Division. Mr. Marusi has been with Borden during the last 13 years.

The Pacific Lumber Company, San Francisco, has appointed **William G. Van Beckum** as director of research.

Charles P. Culp, assistant manager of trade sales of the DuPont Company's Finishes Division since 1945, has been appointed Atlanta regional sales manager of the division, with headquarters in Atlanta, Ga.

NEW WAREHOUSES

Georgia-Pacific Plywood Company's nationally known products are now available to customers in Cleveland and New Orleans through the recently opened Georgia-Pacific warehouses in those cities.

BRADLEY

HARDWOOD FURNITURE DIMENSION

Solid and Glued Cut to Size Run to Detail

Finest Workmanship

BUILDING TRADE REQUIREMENTS

Mixed cars comprising hardwood flooring in Straight-line standard strip and Unit Wood Blocks in oak, beech, pecan; Random Width Oak Plank—each finished or unfinished. Oak stair treads, risers, thresholds. Arkansas Soft Pine trim, mouldings, finish, yard stock.

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BRADLEY LUMBER COMPANY *of Arkansas*

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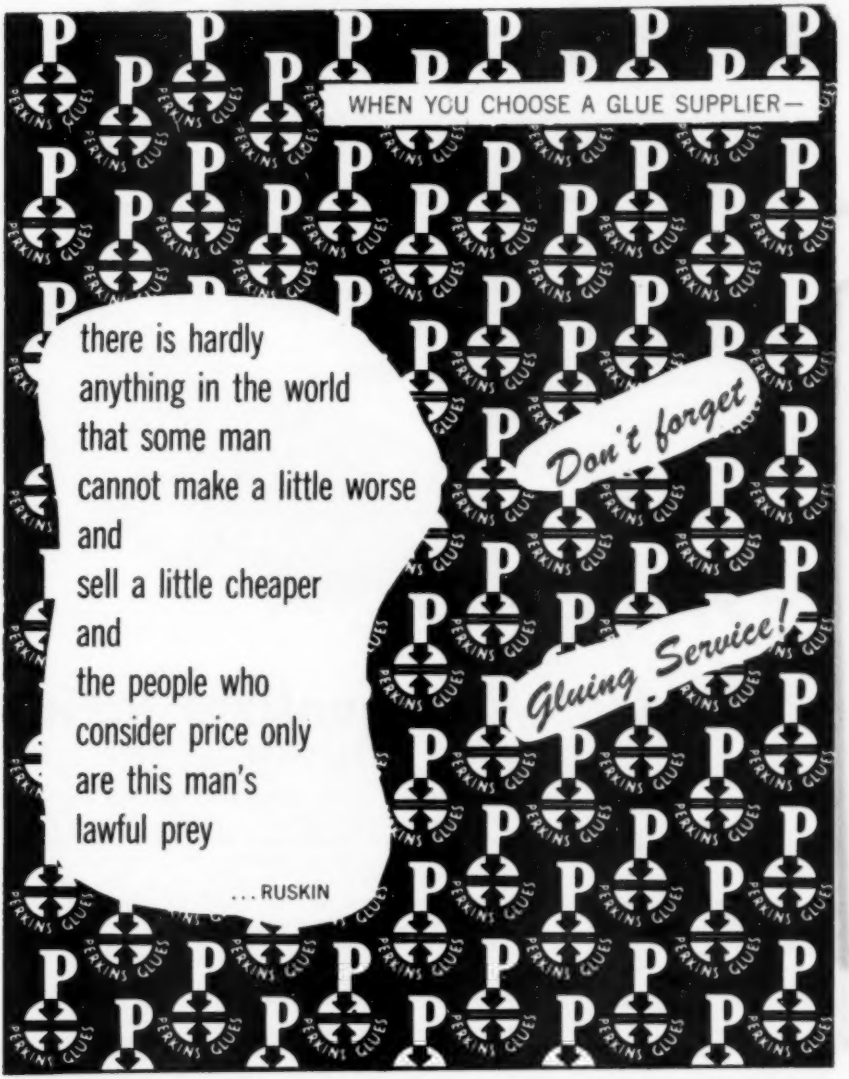

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Manufacturers of Resin, Casein, Vegetable, and Liquid Hide Glues

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MEANS EXTRA SALES FOR YOUR TABLES

IMPROVE your extension table design with Wabash Equalizer Slides. Smooth, easy operation and increased convenience adds extra sales appeal. Have the extension features of your new tables styled by specialists at no extra cost. We manufacture a complete line of "no-sag" slides, folding leaf equipment and top locks.

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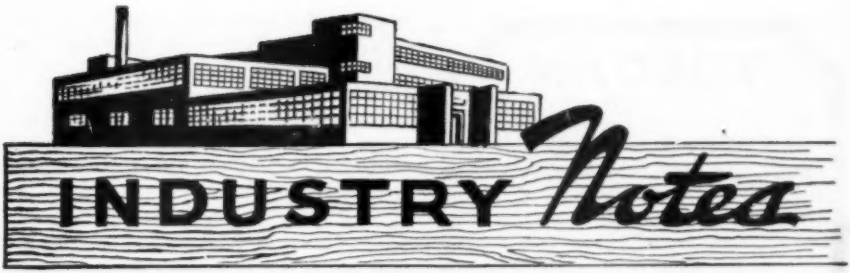
B. WALTER & COMPANY, INC. WABASH, INDIANA

Walter of Wabash



A.S.M.E. FALL MEETING

The American Society of Mechanical Engineers has chosen Chicago as the site for its fall meeting, September 7-11, at the Sherman Hotel. Of particular interest to woodworkers are the sessions planned for Thursday and Friday in the wood industries section.

Topics include: "Plywood is Engineered Wood," "Developments of Materials for Tools for the Cutting of Wood," and "Waste Utilization." A complete wood symposium is planned for Thursday and Friday with speakers representing all phases of wood utilization.

FIELD OPEN HOUSE

During the week of the Boston Furniture Show, September 8-12, the William H. Field Company plans to hold their second annual open house and woodworking machinery show at their plant, 323 Dorchester Ave., Boston, Mass. Invitations are being sent to many woodworkers in the New England area. The company is interested in having anybody with an active interest in woodworking come to visit the displays.

They will have operating a complete Porter two-saw rough mill setup, consisting of the whole line from the Porter Hydracut saws through a Porter Surfacemaster and then through a Buss No. 44 surfacer with all the conveyor equipment between. Other machines will also be in operation and factory men from various woodworking machinery companies will be in attendance to answer questions regarding the machines.

CONSULTING SERVICE

Peter Koch, who prior to the recent death of Mr. W. T. Pritchard was Assistant-to-the-President of Stetson-Ross Machine Company, has announced that he is opening a consulting engineering office in Seattle, Washington.

Mr. Koch who is well known in the lumber trade for his several published papers on planing mill design and through his former association with Stetson-Ross, informs us he intends to specialize in the design, analysis, and construction supervision of planing mills and other wood processing plants. His office is located in the Arctic Building in downtown Seattle.

WOOD SEASONING CLINIC

The New England Kiln Drying Association plans a two-day wood seasoning program to be held at the University of New Hampshire, Durham, N. H., September 11 and 12. The program will include talks on experiments in seasoning beech lumber and the relationship of wood seasoning to gluing. A trip to the modern planing mill of W. H. Champlin Company at Rochester, N. H. is scheduled.

There are a number of outstanding authorities speaking on the program. One of the meeting's highlights will be the lobster dinner planned for the first evening.

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The Binks Manufacturing Company, 3122 Carroll Ave., Chicago 12, Ill., an-

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company names, trademarks, initials, serial numbers, or any design — on wood, leather, rubber or plastics.
For furniture, tires, movable equipment such as shovels and ladders, wooden shipping cases, tool handles and hundreds of other articles where permanent identification is desirable.
Send specifications for quotation.
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INDUSTRIAL FLOOR TRUCKS

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No. 327 — Hardwood body and stakes, steel tie rods in frame, welded steel sockets.

No. 423—Tilt top style. Hardwood deck, "all-welded" steel frame. Lattice end racks.

No. 749—"All-welded" steel Jig Skid. Can be tailored to your specifications. Upright posts used as gauge.

Semi-live Skid moves, stores, delivers product WITHOUT RELOADING. Assures Continuous Production, Activated Storage, Accelerated Shipment.

For details write for bulletins

TOWSLEY TRUCKS, INC.
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nounces the following schedule for the fall, 1952, program of its spray painting school: September 8-12, October 6-10, November 10-14.

William Beacham, nationally known paint chemist and spray painting authority, is in charge of the classes, which are conducted at the Chicago plant. During the five-day program each member of the class examines and discusses the operation, the maintenance and repair of both manual and automatic spray guns. The common causes of faulty spraying are described and methods of avoiding or correcting them are clearly explained.

AUSTRIAN TEAM INSPECTS

Members of the Mutual Security Agency's Austrian Saw Blades and Machine Knives Productivity Team inspected operations at the Big Four Carbide Tool Company, 5938 Carthage Ave., Cincinnati, Ohio, recently.

Arrangements are underway for the team to visit other factories in New York, Philadelphia, Cleveland, Columbus, Washington, and Rockford, Illinois.

HELP WANTED

Were you there?

Did you attend the First Cooperative Safety Congress at the Hotel Pfister in Milwaukee in October, 1912?

Do you know anyone who was there?

If so, please tell the National Safety Council.

The Council is holding the 40th National Safety Congress, its annual convention, in Chicago, October 20-24, and it wants to honor anyone who attended that first Congress 40 years ago.

So if you were there, or know anyone who was, please write Paul Jones at the National Safety Council, 425 North Michigan Avenue, Chicago 11, Ill. He'll appreciate it.

ROSCOE W. SEGAR

Roscoe Westbrooke Segar, 51, owner of the Roscoe W. Segar advertising agency, Portland, Oregon, passed away in July. He was a long time friend of WOOD WORKING DIGEST and was well known by many in the woodworking field.

NEW SPRAY GUN

A new spray gun with ultra sensitive controls for fine spraying has been introduced by the DeVilbiss Company, 1019 Spitzer Bldg., Toledo, Ohio, and is available for immediate delivery.

The new gun, designated as type EGA, is designed for small refinishing jobs, stenciling, blending, high-lighting and decorative work. Its spray pattern is medium-sized and can be adjusted to practically pin-point size for touch-up work.

The new gun is lightweight and can be used with standard glass jar fluid containers of 2, 4, 6 or 16 oz. capacity. The trigger which actuates both the air valve and fluid needle is designed for left or right hand operators.

While the EGA is the smallest spray gun in the DeVilbiss line, the company's engineers have designed it to withstand rugged usage and have incorporated the proven ball and cone principle in the fluid tip and air cap.

YOU CAN PULL PROFIT OUT OF CLEAN AIR!

Large cyclone collector is part of Dixie installation at Ox Fiber Brush Co., at Frederick, Maryland

Efficient dust control means greater output for less cost in any plant where industrial dust is a problem. Thousands of woodworking plants big and small are today benefiting from tailor-made dust removal systems designed and installed by Dixie. If you have a dust problem, consult a Dixie engineer for expert direction . . . There's no obligation.

GET THIS FREE BOOK . . .

Dixie Booklet 47b "DUST COLLECTORS" contains valuable data and charts to guide you in determining the requirements for adequate dust removal in your plant. Write for it today. . . . It's FREE.

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is the Single, Logical Source for all your PLYWOOD needs

AETNA supplies plywood for a wide range of products.

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Aetna has a large stock of Borden Glues, Monsanto Sealers and Bleaches to meet your most exacting needs.

Aetna provides plywood for every woodworking use — by the carload or by the panel — depending on your requirements. Aetna supplies plywood for fabrication, from small toy parts to important members of airplanes . . . from small case goods to large office interiors and furniture.

Here are 5 reasons why Aetna is the single, most logical source of all your plywood needs:

1 LARGE STOCK on hand, including sizes cut to your specifications.

2 OVER 40 SPECIES — Fir, Gum, Birch, Mahogany, Walnut, etc., in stock $\frac{1}{16}$" to 3" thick, 36" x 48" to 48" x 192".

3 MILL SHIPMENTS to your exact requirements.

4 QUICK DELIVERIES from 4 strategically located warehouses — completely stocked.

5 ENGINEERING STAFF to give you solid technical help in the form of performance data, design calculations, information on unusual applications.

That's it . . . huge stock, wide range, quick service and technical help at no extra cost.

It will pay you to investigate the complete facilities and services of Aetna. Write today.

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BRANCH WAREHOUSES: Grand Rapids 7, Mich.; Indianapolis 2, Ind.; Rockford, Ill.

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VENEER PLYWOOD AND LAMINATED WOOD SECTION

Features . . . .

Types of Plywood
By Thomas Perry

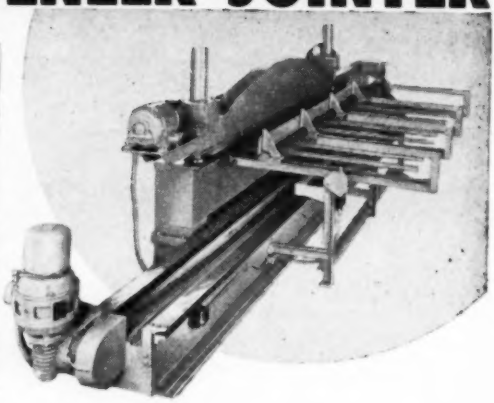
Veneer & Plywood
By Ned Bailey

Mereen-Johnson VENEER JOINTER

Traveling Head Eliminates Shifting —Makes Straight Joints

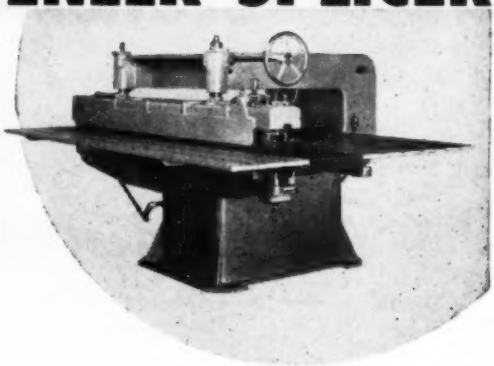
No chain feed—no stock wobble. It's the most accurate machine available for this type of work. Bundles of veneer up to four inches thick are firmly clamped in the machine. The jointing heads travel past the stock. Equipment includes four knife, round, roughing and finishing heads. Accessories such as swivel mounted roughing motor . . . mechanical loader . . . glue spreading attachment . . . head jointing attachment . . . dust piping . . . are readily available.

6 SIZES: 90", 102", 126", 150", 200", 212".



Mereen-Johnson VENEER SPLICER

Precision tapeless joints — self-adjusting for varying thicknesses. About the only adjustment required by this machine is speed variation, regulated from 15 to 120 feet per minute. Either glue or catalyst is applied smoothly and evenly by the revolving glue disc at the infeed end. Chains are self-cleaning.



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JOINTER-SPLICER *Bulletin*

Mereen-Johnson MACHINE COMPANY
4401 LYNDALE AVENUE NORTH • MINNEAPOLIS 12, MINNESOTA

TYPES OF PLYWOOD

Part 11

THIN PLYWOOD FOR AIRCRAFT

By Thomas D. Perry

THIS IS a rather new type of plywood which has resulted from the availability of phenol-formaldehyde resin adhesives in film form in the late 1930's. The trade name of this film, Tego, is derived from the initial letters of its originator, the Theodore E. Goldschmidt Company of Essen, Germany.

Before the advent of Tego, it had been found very difficult to spread any type of liquid glue mixtures on veneers thinner than 1/30", due to the tendency of the tacky solution to drag the thin veneer around the spreader rollers. Another complication was the fact that the low limits of practical spreading were not low enough to prevent objectionable "strike through," or penetration, of the adhesive through the face veneers in hot pressing.

The use of this film permitted making 3-ply constructions as thin as 1/32", usually consisting of three veneer layers 1/80" thick, the difference in total thickness being an allowance for slight compression in hot pressing. Plywood thicknesses of 1/16", 3/32" and 1/8" were common in 3-ply, 5-ply and 7-ply constructions. This thin, film-bonded plywood found extensive use in the small aircraft of World War II, especially in trainer types. As the size of airplanes increased, much of this thin plywood was displaced by thin lightweight metals and plastic sheets, although none of them had the favorable strength-weight and stiffness-weight ratios of the thin plywood. This thin plywood, however, continued to be useful for fuselage linings, hollow stressed skin partitions, honeycomb core constructions, scale models, mock-ups and the like. This thin plywood still finds extensive use in stringed musical instruments, such as violins, guitars, etc., where the plywood retains the resonant qualities of solid wood and is relatively free from tendencies to check, buckle and twist, which are inevitable in thin solid wood.

Cutting Thin Veneer For Thin Plywood

While thin veneers can be lathe cut to 1/50" thickness, the handling of large sheets, on the clipper tables and through the driers, leads to an unreasonable amount of breakage, both in green and dry veneers. Hence most thin veneer, 1/30" and thinner, is sliced, resulting in relatively narrow strips which can be handled with a minimum of damage. If veneer slices are not available, half round cutting on a rotary lathe equipped with a stay log, is equally

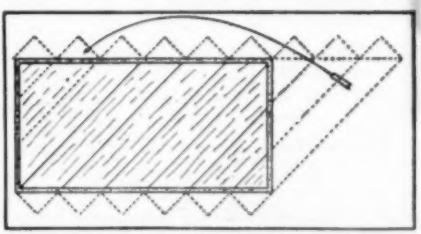

Fig. 1. Splicing 45° veneer and reinforcing edges with gummed tape.

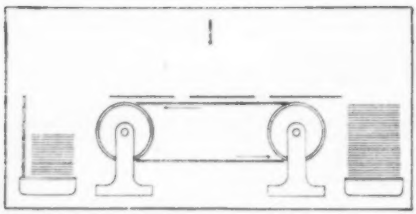

Fig. 2. Spraying veneer for film gluing.

satisfactory. Such thin veneers should be dried to slightly under 10% m.c. and continuously stored under conditions that will maintain an equilibrium moisture content of 8% to 10%. Drier veneer tends to split and break, even in narrow sliced strips. Some operators prefer quarter sliced to plain sliced veneers, but it is doubtful whether this difference is significant in such thin veneers.

Preparing Thin Veneers For Gluing

Such thin veneers can be jointed and edge glued as is customary with veneers of normal thickness on a tapeless splicer. One construction that was found particularly effective in hollow girders of the stressed skin type, required veneers laid at an angle of 45°, as is indicated in Fig. 1. Such 45° plywood was more easily curved, as in ailerons and flaps, than was normal plywood with rectangular grain. Much of the end waste in this 45° splicing can be eliminated by clipping the angular section A at the right and splicing it on at the left as is indicated. Since large sheets of spliced thin veneer are extremely difficult to handle without breaking, an excellent precautionary measure is to bind all ends and edges with 1/2" wide gummed tape, as is shown in Fig. 1. This tape will be cut off in trimming to size.

Maintaining uniform moisture content in thin veneer requires care, since its wide area and thinness make it particularly susceptible to gaining or losing moisture. It is important that veneers for successful Tego gluing have approximately 10% m.c., based on 1/20" to 1/24" birch veneer. Thinner veneers or species of lower density need a trifle higher moisture content to provide enough free moisture to establish the initial flow of the resin of the film during hot pressing. This resin on the paper carrier has been dried and partly cured. It can only be reactivated by moisture, which must come from the wood. Too much moisture may cause steam blisters in hot pressing. It is a somewhat critical situation which must be worked out carefully for each con-

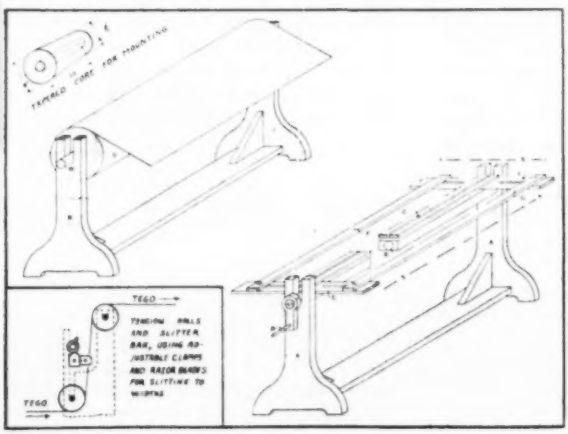
TAPERED CORE FOR MOUNTING
TEGO
TENSION RAILS AND SLITTER BAR, USING ADJUSTABLE CLAMPS AND RAZOR BLADES FOR SLITTING TO WIDTHS
TEGO

Fig. 3. Trunnions and reel for dimensioning film.

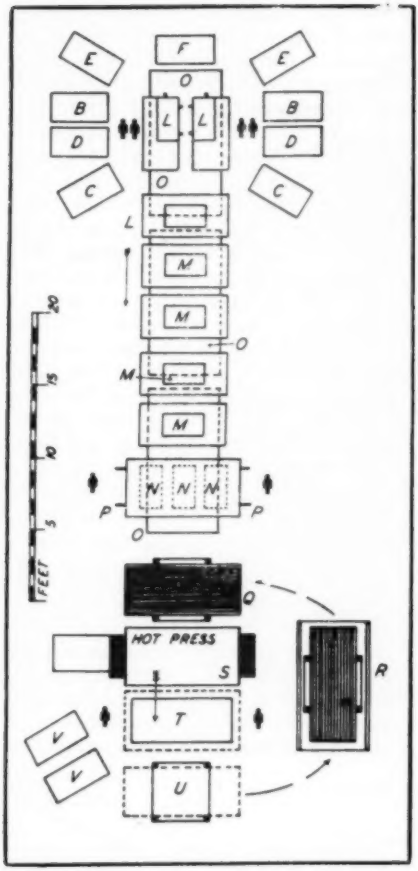

Fig. 4. Layout for hot press department in film gluing. B, C, D, E, veneers on trucks ready to lay-up; F, dimensioned sheets of film; L, lay-up racks on plywood pallets; M, hot press charges of laid up veneers on plywood pallets; N, veneers assembled into plywood, between aluminum cauls; O, roller top tables, mounted on casters; P-P, lifting bars to load hot press; Q, metal cauls used in N; R, cauls in rack, over cooling fans; T, hot plywood direct from the hot press; U, hot cauls on rack, just from hot press, made for cooling; V, completed plywood, ready to cool down for trimming.

struction, and continuously controlled with equal care.

The most satisfactory method is to spray the veneer to bring its moisture content up to the required percentage, just before it is to be laid up. Under most conditions in the average plywood plant, thin veneer will be considerably under 10% m.c. A simple and easily made device for such spraying is shown in Fig. 2, with overhead water spray nozzles, or a series of nozzles. The endless belt, on which the veneer travels under the spray, should be adjustable as to speed, since this is a simpler control for moisture content than adjustments in the spray heads. Veneers, after splicing, trimming and reinforcing the edges, are moistened on the upper side only, and piled solid. When this pile of sprayed veneer is weighted down, the moisture will be sufficiently diffused, after an hour or two, to be ready for the lay-up tables. It is not safe to allow these moistened piles to stand overnight. It is unnecessary to moisten the center layer of any plywood assembly, since the hot press platens tend to drive the moisture toward the center of any plywood assembly.

Dimensioning the Film

Equipment for dimensioning the film is indicated in Fig. 3, requiring three pairs of trunnions arranged as shown in the sketches. The film is cut to width by adjustable razor blades on the center pair of trunnions. Only the top of this center pair is shown in the lower left sketch. The strips of film, which have been slit apart, are wound on the reel at the right until some 30 layers are accumulated, and then cut apart, over slot C, with a sharp hooked knife such as is provided for linoleum trimming. Some operators find it more convenient to reroll the narrow strips of film which may have been cut to standard widths, and cut them to length in a subsequent operation on a reel that need not be

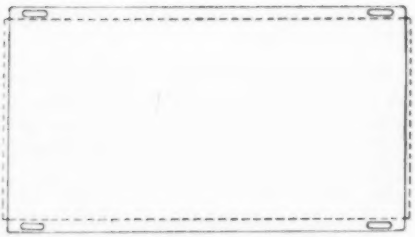

Fig. 5. Hot press cauls with hand holes.

as large as that shown in Fig. 3. When there are relatively small quantities of assorted sizes it may be economical to provide an unrolling stand on a table, with a large pivoted knife, such as is used for cutting cardboard.

Hot Pressing Thin Plywood

The arrangement of the hot press department is important to reduce unnecessary handling to a minimum. A typical layout is given in Fig. 4, which is a bit on the ideal side, and may be condensed if room is not available. The working crew required is indicated by small silhouettes, not including the department foreman. Aluminum cauls, approximately 16 gauge, are important in making thin plywood, and should always be cooled before assembling at N-N-N-. It has been found convenient to have cauls about 2" shorter than the hot press openings, for easy loading, and several inches wider for easy handling into and out of the hot press, as is indicated in Fig. 5. The hand holes are particularly useful in unloading the hot press and racking the hot cauls.

The question is often raised as to whether it is economical and practical to assemble thin plywood in double or triple layers between cauls for hot pressing. This may be a distinct saving in hot press time, but presents two problems that require careful watching and may offset this saving in time. In the first place it is imperative that two or three or more plywood assemblies between a pair of cauls, be kept in proper vertical alignment, since any overhanging edges will not be subject to adequate pressure during the resin curing cycle. This can be prevented by taping these assemblies together at opposite corners to eliminate possible slippage. The other problem is the possibility of "strike through" of the adhesive from one panel to another. This will make them difficult to separate and may cause damage by pulling out sections of adjacent surfaces. This problem will be most serious with very thin or very porous veneers, or may occur when veneer has too high a moisture content, causing excess penetration. This adhering of adjacent panels may be prevented by interleaving with cheap paper, a somewhat expensive and time consuming step that may retard production. Whether or not such doubling up is an advantage should be definitely determined at the start of each run.

The hot plywood, direct from the press, should be piled on a perfectly flat truck or pallet of sufficient size to avoid any overhangs, and should be weighted down until it cools. An alternate method to speed up this cooling process, is to quickly dip this hot plywood in a water tank, made and stiff-

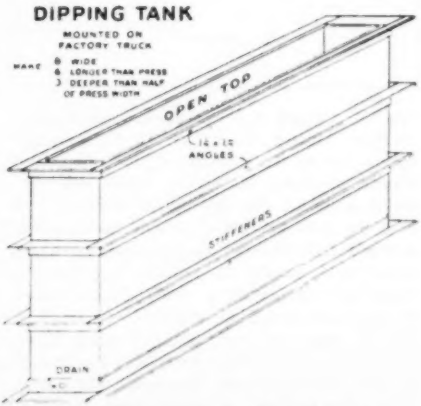

Fig. 6. Dipping tank for hot plywood.

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Only fine veneers create such rich dignity

Here is a beautiful example of what can be done with character grain walnut. It illustrates the growing trend to capitalize on the individual grain characteristics created by nature. Texture, so highly regarded in modern design, is best achieved in these beautiful contrasting grains.

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These higher grades of VENEER and LUMBER manufactured and available at all times

American Walnut . . . Avodire . . . Hard Maple . . . White Ash . . . Yellow Poplar . . . Cherry . . . Indiana Soft Textured White and Red Oak . . . Butternut . . . Prima Vera . . . Honduras and African Mahogany . . . Knotty Pine . . . Sapeli . . . Special logs for special places . . . lumber from modern dry kilns.

ened as shown in Fig. 6. This dipping restores the moisture that has been lost in hot pressing, and will equalize the plywood, as to moisture and temperature, after standing overnight. Emphasis should be laid on prompt dipping after removal from the hot press. Delayed dipping, after plywood has partly cooled, may lead to mildew and discoloration.

Piles of thin plywood on flat bases should always be weighted down, with a head block of adequate size and at least 2" thick, to preserve its flatness, since thin plywood is decidedly susceptible to warping and twisting if not properly stored.

Trimming and Sanding

The quickest and cheapest way to trim such thin plywood to dimension is on a sharp clipper, such as is used for trimming veneer. This will be found satisfactory up to about 3/32" plywood thickness. Above that thickness, the usual double trim saws give the best results. Several sheets can be trimmed in one passage over the saws, but suitable holddown devices must be located near the saw blades to prevent the sheets of plywood from springing apart due to the upward pressure of the saws.

Sanding of such thin plywood is optional according to the use to which it is to be put. In some applications the glossy and somewhat "ironed" surface, produced by the hot press, is an advantage. In others, especially in very thin veneers, the danger of sanding through the face veneer may be serious. If a well maintained wood scraper is available, it will clean up the veneer surface with a thinner shaving than any sander. In any event, sanding must be done with a very fine grit in an open coating type, to avoid clogging and dulling the abrasive particles due to the resin that has

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By all means, look at the samples. But take an even closer look at the company that stands behind them. Anyone can make a good sample. But to deliver top quality hardwood plywood in every panel of a large order requires modern mill facilities and the latest manufacturing methods.

Georgia-Pacific hardwood plywoods, manufactured at our big, new Savannah plant, are checked for quality at every stage of production . . . bonded with resin adhesives on hot plate presses . . . and specially processed for greater stability.

You'll get quality you can depend on in G-P Crownply (for decorative use), G-P Crownbord (for cut-ups and shop work), G-P Plysheet (general utility) and Container Grade (for boxes and crates).

See your G-P Hardwood Plywood representative, or write Georgia-Pacific Plywood Company, 620-9F Southern Finance Building, Augusta, Ga.

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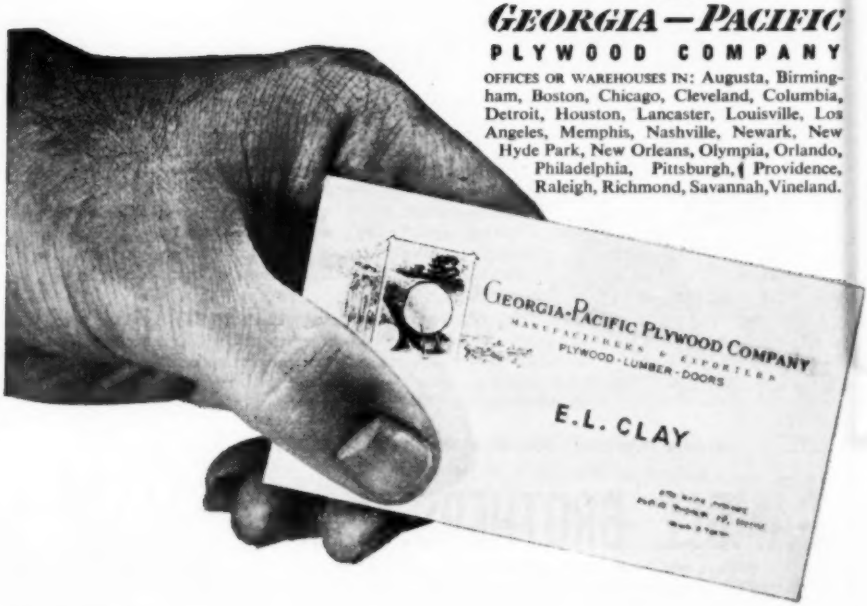

to be removed if any "strike through" is encountered.

Secondary, or assembly gluing, where hot pressed thin plywood is to be glued to other plywood or to framework, as is the case in hollow girders, requires careful attention. Many assembly glues do not readily penetrate a hot pressed plywood surface. The best results will be secured by spot sanding, or scraping, or roughening with steel wool, wherever the glue joints are to occur.

Film Glues vs. Spreading Liquid Mixtures

It was noted, early in this article, that it was difficult to spread a liquid adhesive mixture on thin veneer, because the veneers would tend to follow around the glue coated rollers and clog the spreader. This can be avoided by equipping the spreader with stripping wires, of braided types for flexibility. Rigid stripper bars are inadequate. Such wire belts are arranged to run over an idle roller at the discharge end of the spreader and through annular grooves cut in the rubber surface of the spreader roll. The normal grooves in a spreader roller are spiral, due to grinding on a screw cutting lathe, and will not serve as a runway for the stripper wires. Such a device is fairly reliable, but requires considerable attention and may cause operating delays, but it can be made to serve.

The greatest difficulty in using liquid adhesives on thin veneer is to secure a thin enough spread to prevent "strike through" when resin adhesives are used in hot pressing. A liquid spread of about 25 lbs. of mixture per 1,000 sq. ft. of glue joint is usually considered a minimum attainable spread. In a normal phenolic resin adhesive mixture, containing 60% solids, this would mean 15 lbs. of solid resin adhesive per 1,000 sq. ft. of glue joint.

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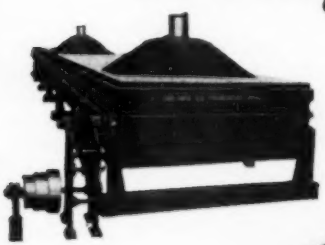
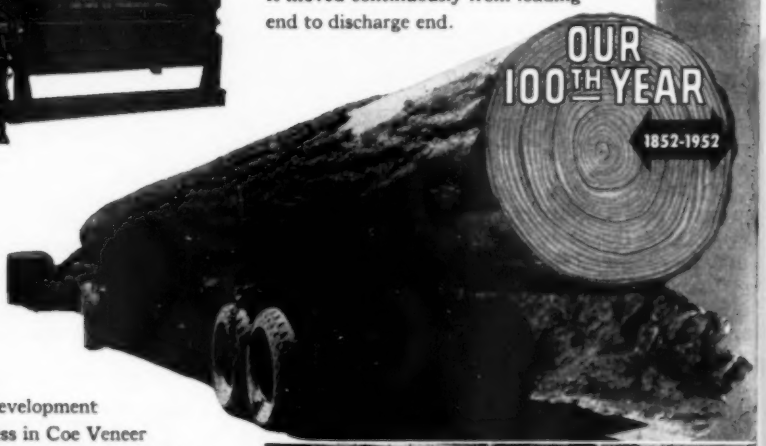


The original Coe Veneer Dryer, first machine in this industry to dry veneer as it moved continuously from loading end to discharge end.



The development progress in Coe Veneer Dryers has been outstanding. Technical and mechanical improvements have gone hand in hand to make the current machines leaders in the field. Dryers have grown in size and at the same time quality of finished product has risen to new standards in keeping with the advance of both veneer and plywood in a manner not previously thought attainable.

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On the other hand, Tego film weighs 12 pounds per 1,000 sq. ft., of which about one third is the very thin paper membrane which serves as the resin carrier. The solid resin amounts to about 8 lbs. per 1,000 sq. ft., or about half the minimum spread that is attainable in applying a liquid mixture. Experience has indicated that this 8 lbs. of resin adhesive makes a sound tight joint between thin veneers, stronger than the wood it holds together. The use of 15 lbs. of solids, the minimum possible with liquid spreads, presents a serious hazard of "strike through," which is a disadvantage, except in impregnation processes.

Another problem encountered in using liquid adhesive spreads on thin veneers, is the need of drying out the surplus solvents for an hour or two, before hot pressing, to avoid steam blisters. This requires time, drying racks and extra handlings.

The availability of thin plywood, including suitable adhesives and the necessary "know how," has added another field of plywood utilization, which has definitely broadened the scope of this versatile material. It was an instance where military requirements gave impetus to a new product, which now has a promising future. How much better it would be if the paths of peace, through intensive research by an industry, could contribute as well, with new and useful products made of veneer, plywood and modern adhesives!

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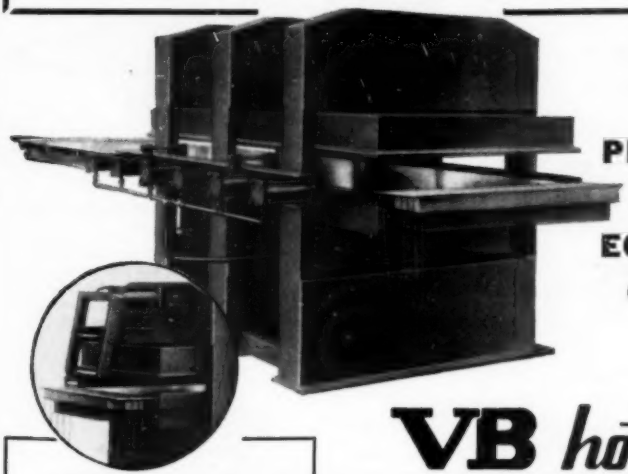

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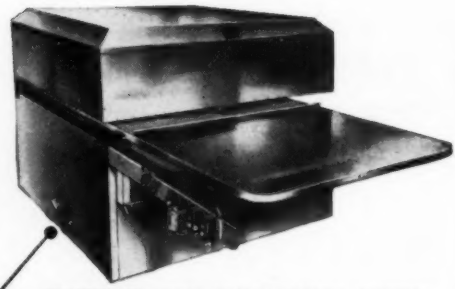

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VENEER and PLYWOOD

OPPORTUNITIES IN PREFAB BUILDING

PART 23

By Ned Bailey

IN THE last few articles in this series we have discussed the important part veneer and plywood play in the prefabricated building industry. In checking these applications preparatory to writing the article, we were surprised that there were so many that directly and indirectly enter into the matter. Here are a few: subflooring, flooring, wall sheathing, roof decking, exterior siding, soffits, gable ends, interior walls and ceilings, built-in cabinets and millwork, concrete forms, beams and wall paneling.

In seeking the best one or ones to add to your production, many matters other than the product itself must be considered. Your proximity to a prefab manufacturing plant; the particular products you can profitably make that they need and availability of your raw material are just a few.

Finding markets of any kind is not easy if you want to get away from keen competition, even though there is such a multiplicity of uses for veneer and plywood. We keep referring to the opportunities in the prefab industry. In reality this is only one small part of the field for veneer and plywood in the building industry. Taken in its entirety, the plywood industry is very closely tied to the building field as you will see if you check the foregoing list.

Fortunately or not, the plywood business is tied in with the building business so that we are greatly affected by it. For example, new home construction very often has a trend downward at the time when commercial and industrial building is rising. Right now they are both doing quite well and would be doing better except for the steel strike. It is hard to gauge demand to the nth degree in this or any field. However, it is safe for the time being to expect a steady demand for practically all the products previously mentioned.

There are certain products that can be figured, as to production needs, with a fair certainty whether for the regular or prefab fields. Stock doors are a good

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illustration. The number of doors per house can be predicted; the size of the replacement demand is fairly well known; the demand for doors in the farm market can be closely estimated; the demand in industrial and commercial building is rather easily figured and inventory demand determined by periodic checking. It is therefore possible to know within narrow limits how many doors will be consumed in a given time and what the prospects are for the immediate future.

This same method, with but slight variations, applies to such other items as subflooring, wall sheathing, roof decking and exterior siding. About 55 percent of plywood production has, in the past, gone into building construction; and with the gradual but appreciable increase in the prefab and pre-cut type of building this percentage should increase. Industrial uses of plywood have been increasing too, but not in the sense of materials used.

It is interesting to note the increase in certain uses of plywood as it concerns housing. Built-in furniture, kitchen built-ins, closets of various types for homes, wall-paneling, flooring and exterior paneling are good illustrations. In my estimation it is safe to say that these items will continue to increase in demand.

In view of the building situation, both residential and industrial plywood for concrete forms should be in good demand for some time to come. Here is an opportunity for those manufacturers of good concrete form plywood to get themselves established. However, they will have to do a job of selling in some areas. Poor plywood made of the wrong wood species and also good plywood improperly used has tended to reduce the demand for this material. Softwood plywood has been found very satisfactory for this use.

Exterior sheathing of plywood is in very good demand and should continue to increase in popularity if for no other reason than the diminishing supply of wide boards.

We are going through a period of transition in our home building architecture and construction that will no doubt continue for several years. Veneer and plywood are playing an important part in this transition because they offer a flexibility of design and a saving in labor and time never before possible.

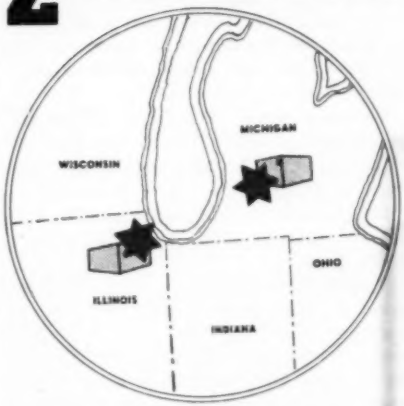
There is no doubt that over a period of years housing utilizations will settle into a pattern, particularly when price levels become more stabilized and design trends are more evident and general. When this happens, building materials will seek their normal and natural markets, and the distortions that have been inherent in these years of "shortages here and oversupply there" will disappear.

A case in point is the fact that it is now becoming clear that in most areas of this country 5/8 inch or 3/4 inch plywood is the accepted standard subflooring material. There is not much in competition with this material that can compare with the time saved through the use of it in large sheets and ease of application.

Another growing demand comes from the growing use of a wide overhang in house construction. This has led to an increased use of plywood for the soffits and this is apparently a market that plywood will continue to serve with almost no competition.

Inside wall paneling, both smooth and in random or regular widths, is going through a test period. There are still the factors of price, design and desirability that keep the decision in the balance. The former is gradually getting better reception, labor and

2 WAREHOUSES



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beauty of finish possibly working in its favor. Until the narrower panel boards come down in price and are more generally known, they will remain among the unknown quantities in the plywood field for home construction.

Plywood stock doors are increasing in demand steadily, but not too rapidly. Flush doors with veneers matching the desires of the buyer are available in quantity and, adding these to the run of the mill variety, we have a very good market.

There is one matter that should be given consideration by manufacturers of veneer and plywood. It is the matter of the size of plywood and veneer panels. In the so-called modern or contemporary design there is a little prejudice against large panels for exterior siding. In fact, for many architectural effects, wide panels have an advantage. Ultimately it may be that plywood will have to fill this demand. Then if the design preference is for 17, 18 or 24 inch boards, the present standard 4 x 8 ft. panels will be pre-cut to those dimensions. It is my belief that at the retail level, at least, these smaller sizes should be made available. I am afraid they will not be, however, unless the manufacturer sells them that way.

The End.

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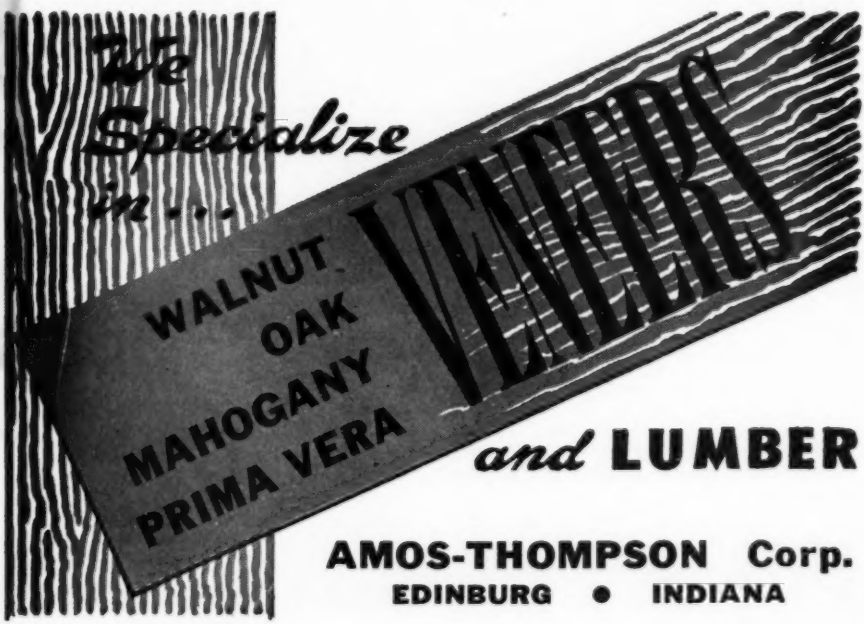
You could work five days a week for the next million years and not make up the time lost as a result of 1951's work accidents. The 280,000,000 man-days of lost labor represents only one aspect of the economic loss from work accidents, according to "Accident Facts," published by the National Safety Council, 425 N. Michigan Ave., Chicago, Ill. Just off the press, the 1952 edition points out that the total cost in dollars of occupational injuries in 1951 reached the staggering total of $2,650,000,000.



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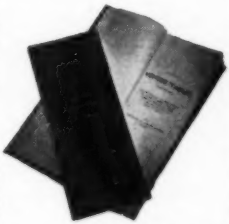

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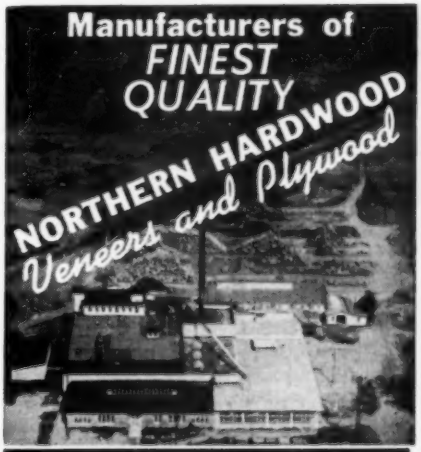

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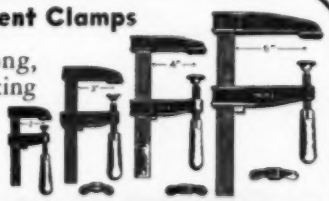

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Kiln Operations At a Custom Drying Plant

Drying of wood is and always will be of considerable importance to the lumber industry. By using the proper fan, heater and control equipment, operating dry kilns can be done efficiently, economically and practically automatically. However, dry kilns, as everyone in the lumber industry knows, can be a very costly "bottle neck" in the production of lumber. Therefore, every efficient operator is continually trying to improve the operation of his dry kilns.

Hartzell Industries of Piqua, Ohio, knows how important proper drying of lumber is. This firm which produces walnut lumber, walnut veneer and aircraft propellers also manufactures industrial fan equipment. Originally the firm produced only hardwood lumber. As producers of lumber and also industrial fans and heater cores, they have facilities to produce the proper fan equipment for dry kilns and also have a large number of dry kilns which can be used as both experimental and production kilns.

Since the very early development of the forced draft kilns, the company has used propeller type fans, mounted in the dry kiln, blowing air first through a unit heater core, then through the lumber and, finally, back to the fan again. The fans run continually while steam to the heater cores is controlled by an air operated valve in the main steam line. This system, from the first, proved to be very efficient, they have said.

At first, standard fans were used that circulated air in one direction only. These did a very good job. The drying rate, however, was controlled on the leaving air side which meant that the drying could not progress any faster than the conditions on the leaving air side of the lumber indicated.

It was found, after some experimentation, that the drying time could be decreased and the uniformity of drying

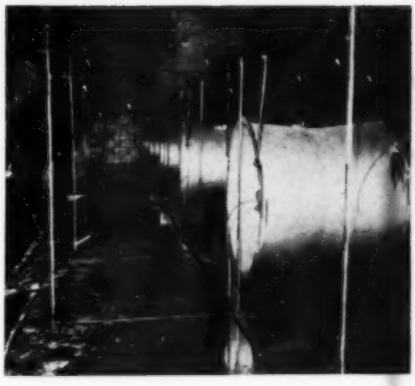


Fig. 1. The plenum chamber contains the fan and heater core equipment.

improved by reversing the air circulation approximately every two hours.

Their fan division then designed a reversible fan that would circulate the same volume of air in either direction of rotation. After the fans were further tried and found to be satisfactory, they were offered to the lumber industry for dry kiln applications.

One of Hartzell's customers, the Cincinnati Kiln Drying Company, installed these fans and heater core equipment and obtained very good results, it is said. As is customary, Hartzell furnished the necessary engineering data, such as general layout, showing the proper manner of mounting the fans and heater equipment and additional helpful information.

Mr. Dennier of the Cincinnati Kiln Drying Company worked out many of the details concerning the actual construction of the kilns. These particular kilns were constructed of concrete block walls laid on a concrete slab floor. The roof consisted of concrete beams covered with a Zonolite concrete mixture for insulation. A built-up felt

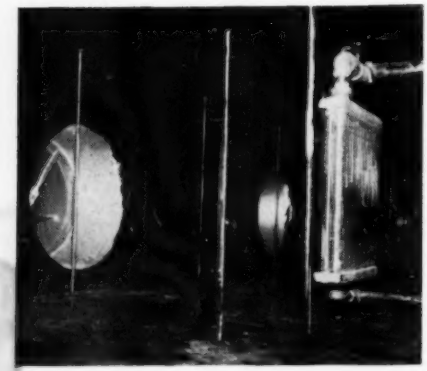


Fig. 2. The heater core equipment is shown mounted approximately five feet in front of the baffle supporting the fans.

roof was laid on top of this to protect the Zonolite concrete from the weather.

These particular kilns measure 52' in length and 18' in width and approximately 12' in height. The plenum chamber shown contains the fan and heater core equipment. Figure 1 shows the fans mounted against the baffle board that runs through the center of the plenum chamber dividing this chamber in half. The fans are mounted against the baffle board which has an opening to fit the opening of each of the fans. The fans are supported at the front and rear by ¾" steel rods. The interior of the kiln, including the concrete block walls, concrete roof, marine plywood ceiling and baffles, are coated with battleship asphalt paint.

The heater core equipment shown in Figure 2 is mounted approximately 5' in front of the baffle supporting the fans. These cores are standard two row 24" fin tube heater cores with copper tubes and aluminum fins. Each core is individually trapped to prevent these cores from becoming waterlogged. The cores are operated on approximately 15 lbs. steam pressure. However, these same cores can be operated on steam pressures as high as 200 lbs. per square inch. For most dry kiln applications, 15 lbs. to 30 lbs. per square inch is recommended.

Part of the air from the fans goes through the heater cores and part goes around the cores and mixes in the plenum chamber on the other side of the cores before going through the lumber.

The wet and dry bulb controls are the Powers number 26 reverse acting air operated regulators and control valves. The regulators are air operated and require a source of clean dry compressed air. When the bulb in the air stream calls for more heat, the regulator opens an air valve and compressed air is fed to the top of the diaphragm of the control valve. This compressed air slowly opens the control valve on the main steam line which feeds live steam to the unit heater cores placed in front of the fans. In case of air failure, the valves are closed automatically by a spring return on the side of the diaphragm opposite to the compressed air inlet.

The humidity in the kiln is controlled by a wet bulb number 26 reverse acting Powers regulator connected to a reverse acting control valve on the steaming line. This steaming line consists of a perforated pipe running the length of the kiln which feeds live steam into the kiln if the humidity drops below a re-

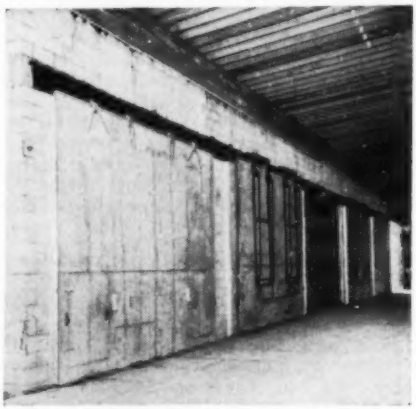
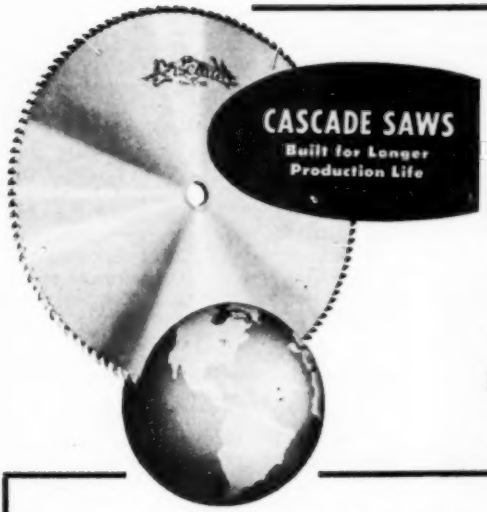


Fig. 3. The door of the kilns shown here is made up of ¼" marine plywood fastened to both sides of a wood frame.



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Quantity	Dia. Size	No. Teeth	Eye Size	R.P.M.	F.S.P.M.	Over or Under	Material Cut	Price

Notice: All C.O.D. Orders must be accompanied with 10% of Purchase Price.

FIRM NAME _____

BY _____

quired level. Since this is a reverse acting valve and regulator, the air pressure opens the valve and a spring closes the valve. In case of air pressure failure, the valve is closed by the spring and prevents the kiln from over-heating.

The electrical setup is fully automatic utilizing a timer, magnetic starter

Fig. 4. Here is the shed which provides dry storage space and also allows loading of lumber during rainy weather.

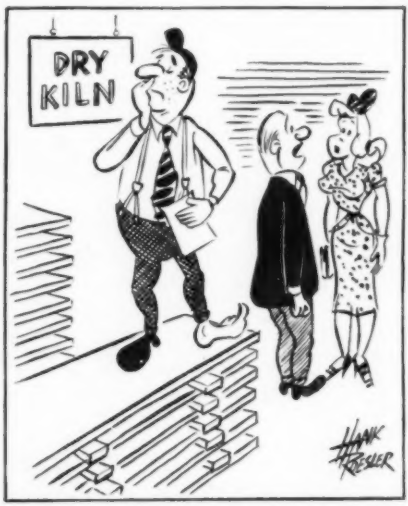
and overload relays on each of the fans. The timer is set on a four hour cycle so that the fan circulates air in one direction for two hours. Then, the electrical circuit is broken for two minutes to allow the fan to come to a full stop before the reverse cycle is started. By reversing the air every two hours, the drying conditions within the kiln are kept uniform.

The boilers used are gas-fired scotch marine (30 h.p.) that are completely automatic. Since the boilers are under 35 h.p., it is not necessary to have a fireman. This helps to keep the overhead to the lowest possible level. Two of these boilers are used for 5 kilns.

The door of the kiln shown in Figure 3 is made up of ¼" marine plywood fastened to both sides of a wood frame. The space between the two inside surfaces of the plywood is filled with glass wool insulation.

The lumber and gun stocks are handled on pallets with a large lift truck. This type of handling system is very versatile and economical. The lumber is moved on the lift truck from the dry kiln to a railroad siding that runs approximately 100' in front of the kilns. The shed roof (Figure 4), shown extending from the front of the dry kiln to the outer support column, runs from kiln number five to the railroad siding. This provides dry storage space and also allows loading of lumber during rainy weather.

The Cincinnati Kiln Drying Company has dried a large number of different types of woods and, in fact, is a custom drying concern. During the last six months of operation, they have dried a large amount of lumber, including 8/4 white oak and a large number of walnut gun stocks. We are told they have dried both the white oak and the walnut gun stocks with a minimum of effort and time and in addition have a very small percentage of degrade.



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• WITH EXCLUSIVE ALL AROUND CLEARANCE CUT!
• WILL NOT CHIP THE WORK AT THE FASTEST FEED!

SHIMER DOOR HEADS

4, 6, and 8-bit model Shimer Door Heads give you all-around clearance cut to prevent chipping the work—at the fastest feeds—plus expansion feature for wider or narrower panel grooves! Equipped with long-lasting Shimer Circular Bits!

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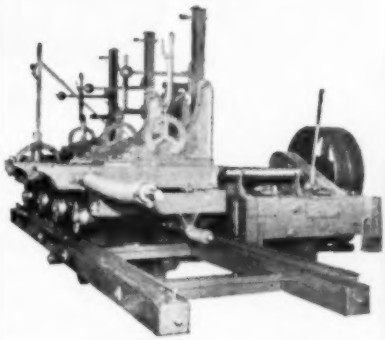

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3 SIDE PLANING MACHINES

Wherever efficient, high speed, and economical performance is required on planing operations, the Schless 3 Side Planing Machine provides the answer. Made in 2 sizes: 16" and 25". Machine illustrated is electrically operated fitted with 4 attached motors. Equipment is well built and precision work is assured. Vertical spindles can be raised or lowered while machine is in motion. Send today for free folder with full specifications.

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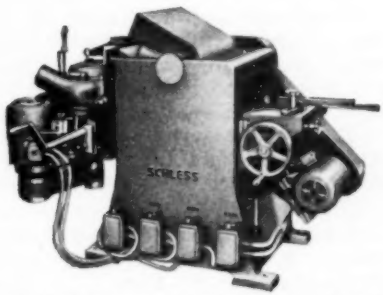
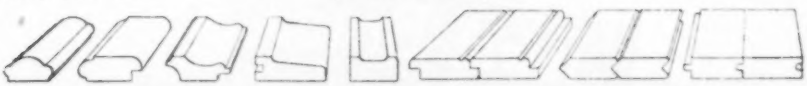


Model DH-4 is now on Demonstration at Industrial Electric Motor & Tool Co., Inc., 110 Lafayette St., New York 13, N. Y.



Universal Technical & Trading Co.
Sole Representative For U.S.A.
10 East 39th Street New York 16, N. Y.

START using Jewel Garnet Belts for a finer FINISH

For big jobs and little jobs, know and insist upon the lustrous beauty of wood products finished to perfection . . . with Jewel *Natural* Garnet abrasive belts.

Toughened and "tempered" by a special, patented process, Jewel natural Garnet cutting edges are made to last longer . . . to cut cleaner, faster . . . to "fill" less quickly. Exclusive "Velvet Joints", featured on *all* Jewel Brand Belts, eliminate bumpy, uneven belt travel, assure satin-smooth finishes and better overall performance. Most important of all, Jewel natural Garnet abrasives help you make worthwhile production savings right from the start, do as good a job and better than many of the more expensive synthetic grits.

Write us direct or ask your jobber for up-to-the-minute information on the complete line of Jewel Garnet Belts for both portable and large stationary belt sanders. Abrasive Products, Inc., 551 Pearl Street, South Braintree 85, Mass.

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WE CAN'T BE BEAT
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SOUTHERN
WOOD SCREWS
(Slotted or Phillips Heads)

have full-size shanks

It's important to your business that you use only wood screws with full-size shanks, rugged single-thread construction and sharp gimlet points. The Federal Bureau of Standards in exhaustive tests has proved that where **holding power** is concerned, a full size shank is a **must.** Only fasteners of this type meet Federal Specifications.

Southern wood screws are precision-milled, with keen, clean-cut threads, gimlet points that bite in and start fast, and that all-important single-thread, full-shank construction. They are made of top quality materials, in a wide range of sizes and finishes. Slotted or Phillips heads. Plentiful stocks available for prompt shipment. Write today for our catalogue.

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New Literature

SAW TIPS

DeWalt, Inc., manufacturer of power cutting tools for wood, metals, plastics, etc., reports that the woodworking bulletin, "Saw Tips," is being re-issued after an absence of almost a year. The Lancaster, Pa. manufacturer says that the bulletin will be issued every two weeks. It will carry detailed discussions of current woodworking problems and developments. "Saw Tips" is intended to be a general information sheet in which there will be something of interest for everyone who is engaged in any phase of woodworking.

MOULDER SERVICE MANUAL

The Dependable Machine Company of Greensboro, N. C., announces their new service manual for moulders. While

America's Fastest SANDER of Irregular Shapes

The New PEARSON Model "A"

Will not disfigure details of mouldings . . .

60% to 80% saving on sandcloth in sanding irregular shapes has been reported by many plants using a PEASON MODEL A SANDER. Other cost saving features include sanding one or more stepdowns at same time, saving several costly operations; sanding of inside radii of circles and very flat tapered moulding. It is one of the fastest and most efficient sanders for irregular shapes on the market today! With the Pearson Belt attachment this model can be converted to an all-purpose sander at a small additional cost.

SAVES 1 or 2 OPERATIONS

Standard equipment includes 7 metal heads and 14 cushions made of the finest grade rubber. Length of cushions range from ¾ to 4 inches; outside diameters, 3¼ to 7 inches.

SAVES 60 TO 80% ON SANDCLOTH

HUNDREDS OF SATISFIED USERS of our Sanding Machines are an indication of the outstanding quality of our equipment. You too can save time and money by turning to PEARSON!

FURTHER INFORMATION ON REQUEST

WE MANUFACTURE BLOCK & EDGE SANDERS, SCROLL AND DRUM SANDERS

PEARSON SANDING MACHINE CO., INC.
HIGH POINT, N. C.

written primarily for users of Dependable electro-unit drive moulders, it is thought that moulder-operators in general might like to have a copy because of the wealth of information contained in the manual.

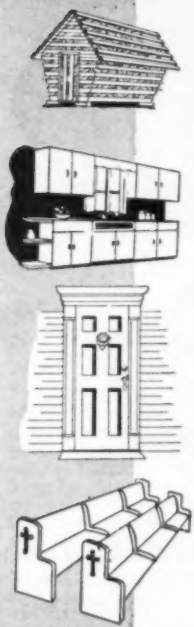
Main topics include explanation of setup and care of cutter heads and knives; operating adjustments and procedures; stoppages and their remedies; types of common finish defects and remedies; and sections on lubrication and safety.

THE LADY AND THE LUMBERJACK, published by Thomas Y. Crowell Company, New York, $3.00.

This book has been called by literary critics, "The best book on logging ever written by a woman, or most men, for that matter." Here is a book that makes loggers live and breathe and brings a soft, gentle, sometimes robust breeze scented with a flavor of Douglas fir.

The book has been written by Olive Barber, for 30 years a logger's wife.

FROM CORN CRIBS TO CHURCH PEWS



CELLUMENT is the **FIRST CHOICE ADHESIVE**

CONSTANT EXPOSURE to blizzards and rain, sub-zero cold and blazing hot sun, requires a glue with unusual resistance to extremes of weather. That's why manufacturers of corn cribs use Cellument.

UTILITARIAN PRODUCTS that are subject to constant hard usage require a glue that is durable and versatile. That's why makers of kitchen cabinets use Cellument throughout, and especially for gluing plastic laminates such as Formica to counter tops.

BEAUTY is more than skin deep and that's why makers of millwork, interior and exterior doors, church furniture, etc., use Cellument. They know that the uniform, high quality gluing results they get enhance the beauty of their products.

Investigate the advantages of using Cellument to glue your products.

- **Write Today for Catalog and Data Sheet 401**

TRADE MARK MONITE FOUNDED 1918

MONITE WATERPROOF GLUE CO.

1037 Monite Building, Minneapolis, Minnesota, U.S.A.

This amazing 63-year-old, gusty, hearty, lovable woman, as cat-footed herself as a logger, has been breaking precedent, shoving aside convention and living a life of excitement which has provided excellent background for this book.

F.P.R.S. MEMBERSHIP DIRECTORY

A 24-page directory of members is now available from the Forest Products Research Society. The directory lists the names and addresses of all members as of April 1, 1952. Distribution will be limited to members of the society. Address your request to the organization, P. O. Box 2010, University Station, Madison 5, Wisconsin.

HOW TO SHARPEN CARBIDE TIPPED SAWS

Here is an instruction booklet for those shops who wish to sharpen their own

AIR CYLINDER

BELLOWS AIR MOTOR COMES COMPLETE WITH ALL OPERATING CONTROLS BUILT-IN. NO EXTRA VALVES TO BUY. REQUIRES ONLY A SINGLE AIR CONNECTION. FIVE BORE SIZES: 1¼", 1¾", 2½", 3⅛", 4½". ANY STROKE LENGTH. MANY MOUNTING STYLES.

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The Bellows Co.

AKRON 9, OHIO

1499

carbide tipped saws and have a sturdy tool and cutter grinder plus the services of a skilled operator.

This illustrated pocket-size booklet, available from Simonds Saw and Steel Co., 470 Main St., Fitchburg, Mass., covers a number of topics. Among the subjects included are the following: correct step by step procedure for sharpening and maintaining carbide tipped wood-cutting saws; exact specifications of the recommended diamond grinding wheels for sharpening the carbide tips; illustrations of tooth styles; detailed drawings showing the various tool grinder setups for grinding the face of the carbide tips, topping them off, grinding alternate top bevel and side dressing. Suggestions on proper care of carbide tipped saws are also included.

SOUTHCO HANDBOOK

This new handbook issued by the

PHEOLL
Wood Screws
● Reduce Assembly Time
● Join Parts Better
● Improve Product Appearance
Use of Pheoll standard and special wood screws reduces overall assembly time and provides the means for joining parts tighter and stronger. Also, they improve the final appearance of your products.
These quality screws are made from cold forged blanks—individually turned, providing clean cutting edges free from nicks and burrs. The sharp gimlet-type point penetrates the wood for a straight and rapid driving start. Spiral threads seat firmly in the wood, providing a rigid bond that resists strain and vibration. Pheoll wood screws are available in slotted or Phillips recessed head types—in a broad range of sizes—all head styles, different metals and in all finishes. Ample stocks of steel and brass wood screws are always carried in stock.
OTHER TYPICAL PHEOLL PRODUCTS
Machine Screws, Tapping Screws, Cap Screws, Set Screws, Stove Bolts, Machine Screw Nuts, Phillips Recessed Head Screws and Bolts, Sems (Lock Washer Screws), Special Fasteners.
PHEOLL
MANUFACTURING COMPANY
5700 ROOSEVELT ROAD, CHICAGO 50, ILL.
SCREWS
BOLTS
NUTS

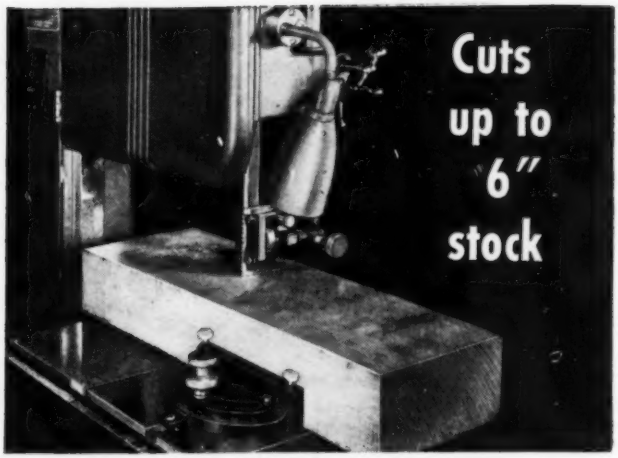
South Chester Corp., Lester, Pa., contains 22 pages of information on industrial fasteners for fastening metal to wood applications. Blind rivets and a variety of door latching and fastening devices are illustrated in this two-color, spiral bound book which also includes several pages of frequently used engineering data.

Installation procedure, sample applications and complete dimensional information are given for all fasteners.

MATTISON MOULDERS

The Mattison Machine Works, Rockford, Illinois, has just issued a new brochure on their electric ball bearing moulders No. 226-228.

The No. 226 moulder is arranged to cut stock up to 12" wide and up to 6" thick. The No. 228 will finish stock up to 16" wide and up to 6" thick. Furnished with conventional roll feed or trackless non-sag feeding chain at additional cost. These machines are



New WALKER-TURNER BAND SAW

For precision-cutting of stock up to 6" thick. New 3-piece frame and body design assures a degree of accuracy, stability and vibration-free operation unattainable in any other type of construction. This 16" Band Saw is one of a complete line of woodworking machines designed by Walker-Turner to speed cutting and cut production costs. At your distributor's, or send for new catalog.

SOLD ONLY THROUGH AUTHORIZED DEALERS

WALKER-TURNER
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KEARNEY AND TRECKER CORPORATION
PLAINFIELD, N. J.

DRILL PRESSES JOINTERS TABLE SAWS BAND SAWS BELT and DISC SURFACERS
JIG SAWS RADIAL SAWS LATHES TILTING ARBOR SAWS

adapted for multiple-knife work, direct from line at 3600 r.p.m., or on higher speeds from frequency changer. Jointing devices for jointing straight or profile knives on all heads can be furnished.

The booklet is well illustrated and completely describes the machines, including all specifications. The manufacturer tells us that these moulders meet all of the requirements for a heavy-duty moulder—powerful, durable and yet flexible enough for quick changes in setup.

N.H.L.A. MEETS IN BOSTON

The National Hardwood Lumber Association plans their 55th meeting for September 23-25, at Boston, Massachusetts. The theme of the convention program will be built around free enterprise and the economic factors having a bearing on it as it affects the hardwood lumber industry. Carl A. Rishell, director of research for the National Lumber Manufacturers Association, is scheduled to appear on the program.

AIR is an inexpensive commodity. Can you afford to gamble with your present obsolete system or put off the installation of a NEW (YOUNG & BERTKE) SYSTEM.

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DUST AND FUME CONTROL SYSTEMS FOR YOUR INDUSTRY

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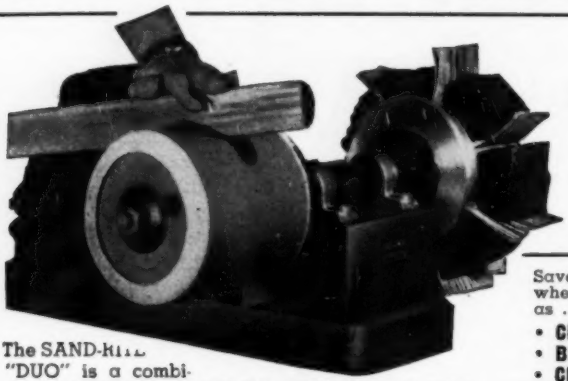
The hardwood industry's biggest customer, the furniture industry, will be represented by the president of Conant, Ball Company of Gardner, Mass., Charles C. Brooks, Jr. The association looks forward to a high attendance and promises a meeting of outstanding value.

HARTZELL TIMBER TRACT

More than 200 sawmill and veneer operators, timber buyers, log producers, foresters and farm woodland owners attended an all day forestry demonstration on the 63-acre tract near Fort Loramie, Ohio, owned by the Hartzell Industries, Inc., of Piqua, Ohio.

The event was sponsored by the American Walnut Manufacturers Association, the Veneer Association, and the Ohio Forestry Association, and was climaxed by the presentation of a plaque designating the tract as Ohio Tree Farm 251. This is the first industry-owned tree farm in Ohio.

SAND CONTOUR SHAPES FASTER



The SAND-RITE "DUO" is a combination Rotary Brush and Pneumatic Drum Sander that is highly versatile for use in every shop.

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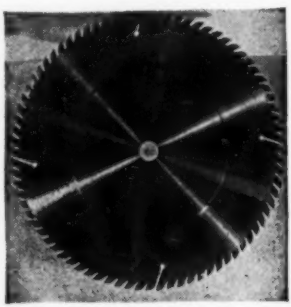
Save time and materials when you sand such items as . . .

- CHAIR LEGS & ARMS
- BRUSH HANDLES
- CHAIR SEATS
- GUN STOCKS
- FURNITURE TRIM
- MOULDINGS

SAND-RITE MFG. CO. Dept. W., 226 W. Schiller St. Chicago 10, Illinois

"VICTORY" SAWS

ARE WAY OUT IN FRONT FOR PRODUCTION CUTTING



Repairing and resharpening service for Carbide Tipped Saws and Tools.

On scores of different jobs, "Victory" Carbide Tipped Saws are giving 40 to 100 times greater production . . . with better finishes, less waste and lower maintenance. They are "tops" in economy for cutting veneer and plywood, plastics and laminated materials and tough grained woods. Write for Victory Saw Bulletin today.

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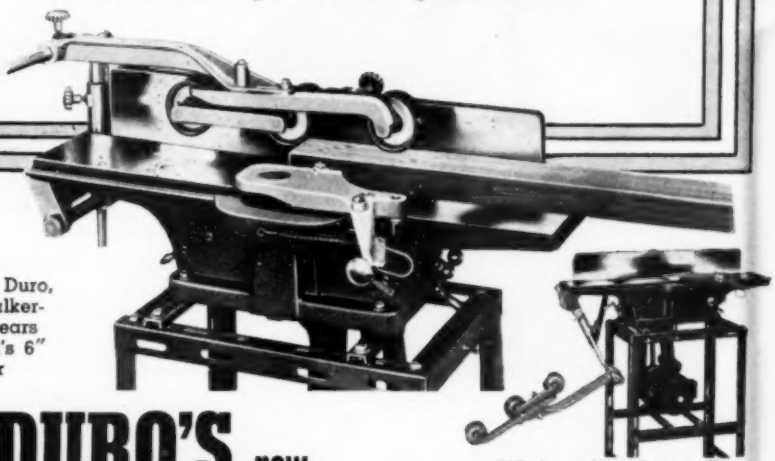
new invention brings added speed, accuracy and safety to 6" jointers



For Atlas, Duro, Delta, Walker-Turner, Sears and Ward's 6" Jointer

DURO'S new safety hold-down & pressure guard

Duro introduces completely new Jointer accessories which greatly reduce personal injury hazard — and make operation faster, easier and more accurate. "Hold-down" has rubber covered rollers which guide the stock, so hands are kept away from cutter head. Automatically maintains continuous, even pressure and guides stock toward fence — so that even warped or twisted lumber is planed perfectly flat and smooth. Swings out of way instantly when not needed. "Pressure Guard" provides side pressure at table level when edge jointing stock. This insures a true edge.

FIG. 1. — Note how easily "Hold-down" can be swung out of position.

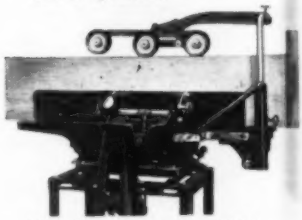


Fig. 2. — showing 8½" vertical capacity of Hold-down.

Send for Circular

Write for special circular giving prices, specifications and full details.

DURO METAL PRODUCTS CO.

Makers of Nationally Advertised Duro-Chrome Hand Tools

DURO Nationally Advertised POWER TOOLS

DURO METAL PRODUCTS CO.
2682 N. Kildare Ave.
Chicago 39, Illinois

Gentlemen:
Please send me full details on the new Duro "Hold-Down" and "Pressure Guard"—also catalog showing complete line of DURO Tools.

Name .....

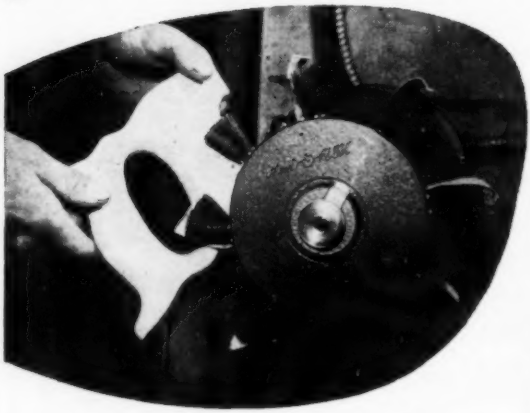
Address .....

City .....Zone .....State .....

For high speed, low cost sanding

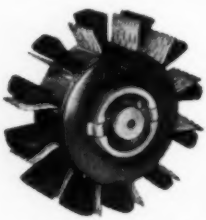
on any contour and hard-to-reach surface — use

SAND-O-FLEX !



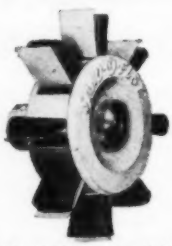
No matter how intricate the shape, Sand-O-Flex can sand it! As the wheel spins, flexible brushes force the garnet cloth down into crevices and over irregular shapes. It immediately adjusts itself to any conceivable contour. It cannot gouge, mar or scorch surfaces. Use it for coarse and finish sanding, portable or for heavy-duty production line jobs. Sand-O-Flex handles jobs no other sander can touch.

Sand-O-Flex requires no expensive setups. Simply mount it to a motor shaft, or any rotating spindle on your present power tools. No skill required, inexperienced help can produce beautiful finishes in a minimum of time. It carries its own supply of abrasive. Loads and feeds out by hand — no monkeying around with looping, gluing and cutting abrasive to fit. Sand-O-Flex abrasive refill cartridges are specially prepared in many grits, from very coarse to extra fine. Scored abrasive refills are supplied for operations requiring greater flexibility.



MODEL 650C for heavy industrial use. Casing dia. 6½"; overall dia. 10¾"; weight 10½ lbs.; 12 brushes using 2½" wide abrasive cartridge; fits ¾" shaft or adapters furnished to fit any size shaft. Available in right and left hand models.

MODEL 550A for production-line duty. Casing dia. 5½", overall dia. 8", weight 2¾ lbs.; 8 brushes using 1" wide abrasive cartridge; fits either ½" or ⅝" shaft or adapters supplied. This unit is shown above, sanding saw handles.



MODEL 350R for portable or stationary use. Fasten to a portable electric drill or flexible shaft for large pieces and assemblies. Casing dia. 3½"; overall dia. 5½"; weight 1¾ lbs. (loaded); 8 brushes using 1" wide abrasive cartridge; fits eitner ½" or ⅝" shaft, or adapters supplied to fit.

For catalog and prices, write to

merit products, inc. 4023 Irving Place Culver City, Calif.

EQUIPMENT and Supplies for the WOODWORKING INDUSTRY

PRODUCTION OF GLUED-UP CORE STOCK

An interesting example of the efficiency and economy gained by continuous straight line production of core stock is the installation recently made in the plant of Carr, Adams & Collier Company. Starting with random length short boards and ending with complete, electronically edge-glued cores, the operation is largely automatic and can be handled by only two men and two girls.

Laying up the blocks on a moving-belt table.

This production line was designed, built and installed by Plycor Company, a division of Earle Hart Woodworking Machine Company, 565 W. Washington Blvd., Chicago, Ill.

Core after curing in the Plycor "Electro-gluer."

At the infeed end of the line, two girl operators work at a moving-belt lay-up table, taking the short, random length blocks from a hopper directly above. The laid-up blocks are carried across the table and as each row reaches the rear edge it is automatically moved onto a transverse conveyor which carries it on to the sticker.

As the row of blocks passes through the sticker, the blocks can be surfaced on any of or all four sides. Then they are automatically carried to the glue spreader where glue is applied to one side of each block.

Continuing down the conveyor, each block is automatically turned on edge so as to be in proper position for assembly. When the row reaches the assembly table the end block hits a limit switch operating an automatic pushover which pushes the entire row, glued on one side, onto the assembly table. This operation continues, row after row of blocks being pushed onto the transfer table, until the desired core width has been reached. At this point, the operator steps on a treadle and a full length edge strip with glue applied is automatically fed to him from a hopper and he drops it into place.

While another core is in process of assembly, this completely laid-up core moves to the position directly in front of the Plycor "Electro-gluer" where it makes contact with a micro-switch and is automatically pushed into the "Electro-gluer." Heat is applied electronically to the glue lines while the entire core is under pressure from top and sides. The curing takes approximately a minute and the finished core is automatically pushed out as the next laid-up core is pushed in.

The operation of the gluing machine is completely automatic, but a fourth operator stands at the out-feed end to stack the completed cores on trucks. This same operator also keeps the edge strip hopper filled.

HUMIDIFYING UNIT

This new Type E humidifier is designed for use in industrial space and will be particularly useful to the woodworking industry for controlling moisture content during storage and processing of wood. Units may be used for complete humidification systems, for spot humidification in large spaces and for boosting the capacity of existing systems.

The self-contained units are manufactured by the Bahnson Co., 1003 S. Marshall St., Winston-Salem, N. C. They are suspended from the ceiling, then connected with the water and electricity

supply. Water is atomized by centrifugal force and distributed horizontally through 360° opening. Any portion of the discharge opening may be blocked off for directional distribution. Units evaporate up to three gallons per hour and may be installed singly or in groups with automatic control. Each unit will humidify several thousand cubic feet of room volume at normal conditions.

ALL PURPOSE CONTOUR SANDER

Here is a piece of equipment being offered by the Sand-Rite Manufacturing Co., 900 W. Lake Street, Chicago, Ill., for use in sanding cornices, blind slats, head and bottom rails, chair arms, gun stocks, patterns, chair and table legs, display fixtures, brush handles and other wood products of rounded contour and irregular shape. Sand-Rite sanders are available in three versatile models: the duo sander, which is a combination rotary brusher and pneumatic drum sander complete with ½ h.p.; the brush sander, which also has a ½ h.p. motor; and the pneumatic drum sander, which comes complete with a 6" pneumatic drum.

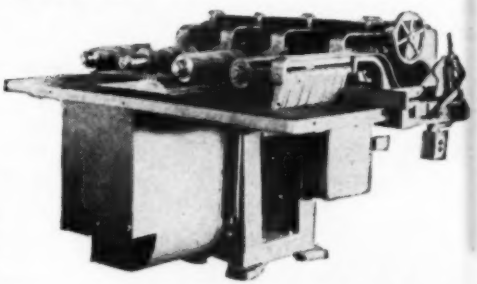
We are told that the machine is constructed so that it can be moved easily. The shaft head operates on set in pillow blocks equipped with ball bearings

A Real Husky

FOR QUICK OPERATION—
DEPENDABLE PERFORMANCE

This sturdy unit is designed specifically for high speed ripping of stock longer than 24" and as a gang ripper for stock as short as 12". The No. 213 is equipped with a stationary table top having all feed works brackets bolted to the top—as is the gear reduction drive. The mandrel rides on ball bearings and is raised and lowered quickly by a hydraulic cylinder. Eight driven rolls feed the stock through the saw at high speed. A 50 H.P. motor drives this unit at full capacity. The No. 213 is a real workhorse, built to handle your toughest jobs. Available for direct motor or V belt drive.

No. 213 A MODERNIZED
HOOSIER SELF FEED RIP SAW



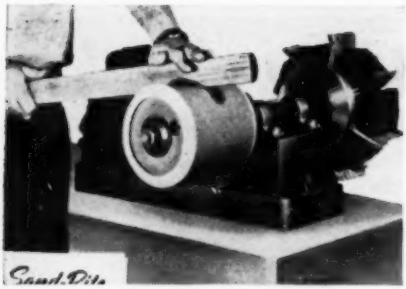
SAW DUST DRUM IS OPTIONAL

DESIGNED FOR THE TOUGHEST RIPPING JOBS

SINKER-DAVIS CO.

230-250 SOUTH MISSOURI ST. DEPT. O

INDIANAPOLIS, INDIANA



spaced with steel collars. The brush head consists of two 7" diameter aluminum wheels ¾" thick and seven brushes, 4" in width. Inflation of the drum is regulated through the air valve.

GLUE BLOCK MACHINE

The new Oliver No. 837 glue block machine is designed to mount on any make of band saw 24" or larger and can be mounted on a special Oliver 18" band saw. The machine will produce triangular-shaped glue blocks from material sizes ⅜" to 1¼" square, in lengths ranging from ½" to 3½". Material is fed to the band saw blade for splitting and then to the cutoff saw for cutting to length. The cutoff saw is adjustable for any number of strokes between 30 and 100 per minute to produce from 60 to 200 glue blocks per minute. The motor is ½ h.p., 1,800 r.p.m., for operation on single phase, 60 cycle, 110 volts.

The Oliver Machinery Co., Grand Rapids, Mich., manufacturer of the machine, tells us that in one test this machine produced over 6,000 glue blocks in 38 minutes. The material was 1" square poplar and the machine was operated at approximately 90 strokes per minute.

We are told that by changing the standard wooden V-trough for guiding the material it is possible to cut round, square or rectangular stock. It is also possible to use the unit on a circular saw table for sawing, or even dadoing the material before the cutting-off operation. With a fine tooth ratchet wheel added, pieces as short as ¼" can be cut.

RESISTANCE HEATER FOR GLUING OPERATIONS

The wide acceptance of resistance-heated flexible strips to speed the gluing of Formica and wood veneers to the edges of furniture panels has resulted in the design of a new transformer greatly improved in appearance and in ease of use, it is claimed by Washburn Electric, 96 Dwight Place, Englewood, N. J.

Previous models required a change of output cable connections to vary heating capacity or heating speed. The new model BU-30-S Washburn heater, illustrated, includes rotary tap switches which allow instant change of output voltage to control heating speed or to select proper output for longer or shorter heating elements. The quick power change is particularly useful when two jigs are being used alternately from the same transformer and an instant voltage change at each curing cycle is required.

Resistance heater units include the BU-30-S transformer complete with all switches and connecting cables; also a stainless steel heating strip with termi-

Resawing . . . 1/10" Strips with the

McDONOUGH 44"

VERTICAL BAND RESAW

Resawing 1/10" strips on a 44" McDonough Vertical Band Resaw.

Anson-Gilkey Co. of Merrill, Wisconsin, needed a high-speed resaw that would cut 1/10" strips, with precision accuracy and minimum kerf wastage. They specified a McDonough 44" Vertical Band Resaw . . . and got exactly what they needed!

For more than sixty years, users the world over have found that for speed, accuracy and versatility, McDonough Band Resaws cannot be equalled. There are reasons:

- Independently adjusted feed rolls
- Exclusive gear type transmission
- Accurately balanced wheels
- Knife-edge sensitive type saw strain
- Electro-filmed feed roll gears and shaft
- And many more proven design features!

For gauge, center, bevel or rip sawing of stock up to 12" wide and to a maximum depth of 29" . . . for greater dependability and top performance—*Specify a McDONOUGH 44" VERTICAL BAND RESAW!*

Write for Complete Information, TODAY!

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McDONOUGH MANUFACTURING CO.
WORLD'S LARGEST PRODUCER OF BAND RESAWS
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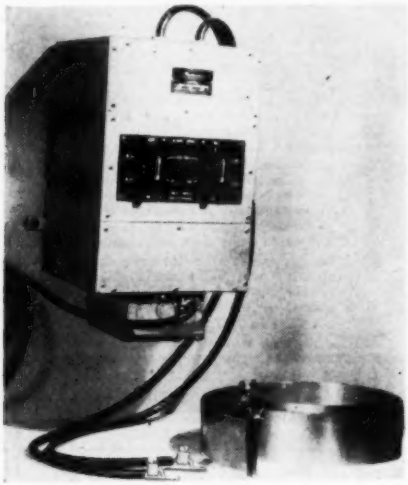
OILSTONE GRINDERS

With one Mummert-Dixon Plurality Oilstone Grinder you get (1) Coarse Oilstone Wheel, (2) Fine Oilstone Wheel, (3) Grinding Cone, (4) Leather Stropping Wheel and (5) General Grinding Wheel. Made in 3 sizes to meet every grinding and sharpening requirement in woodworking plants. Designed for hard and long usage. Efficient. Easily accessible. Investigate Mummert-Dixon equipment now. Send for informative literature today. No obligation.

MUMMERT-DIXON CO.
124 Philadelphia St., Hanover, Pennsylvania

nals. The unit is ready for operation when the heater strip is inserted in the gluing jig. Curing periods for edge-banding with Formica average between one and two minutes.

Although previously used for edge-banding, resistance heaters are finding



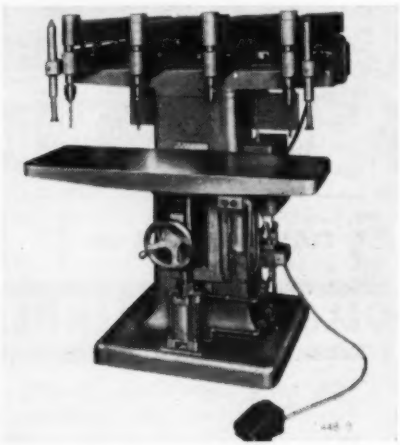
wide use in other high speed, heated gluing operations such as laminating of curved, molded furniture parts and parts for musical instrument cases. They are also used for fast cure in general assembly gluing where glue lines are at or near the surface and can be partially cured by contact with a heated strip shaped to fit the joint.

MULTIPLE SPINDLE BORER

The new Ecco No. 448 multiple spindle borer is now available to the woodworking industry. It is manufactured by Ekstrom, Carlson & Co., Dept. W-9, 1411 Railroad Ave., Rockford, Ill.

The standard machine has four spindles (which may be set as close as 2½" center-to-center) and two spring holddowns, each can be positioned forward, backward or sideways as desired on two T-slot rails. Individual belted motor drive on each spindle can be independently turned on or left idle. The machine can also be set up for single or series operations using multiple position work fixtures.

Also available with more spindles, two spindle cluster heads, larger work



CYCLONE Installation of twin set of Cyclone Dust Collectors on boiler house roof of modern woodworking plant.
Est. 1903

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ENGINEERING ABILITY AND EXPERIENCE

When you install a Cyclone System of Dust Collection in your plant, you can be sure the equipment is designed, engineered and placed in operation . . . to meet your specific needs. Here at Cyclone we have qualified and experienced personnel to help solve your dust control problems. Contact us for engineering survey with a view to increasing your output and saving you money. No obligation.

CYCLONE BLOW PIPE CO.
2546 WEST TWENTY-FIRST STREET
CHICAGO 8 ILLINOIS

tables or longer spindle mounting, the machine is said to be versatile, quiet in operation, easily adjustable and has an automatic (air-operated) table feed cycle. Spindles in sleeve bearing cluster heads can be furnished to special order with center-to-center distances ranging down to a 5/8" minimum while 1 1/8" is the minimum center-to-center distance for cluster heads using ball bearings.

NEW MODEL FOR DE WALT

De Walt, Inc., Lancaster, Pa., makers of a popular line of radial arm cutting tools, now offer a new Model GE machine with power cross feed. In addition to power cross feed, this machine is said to retain flexible features found in other DeWalt models.

Besides the normal, straight cutoff, the De Walt machine is also capable of making miter cuts, bevel cuts and compound miter (bevel miter) cuts with the power cross feed. Materials up to 2"x18" can be cut with the power cross feed without any adjustments in the air feed mechanism. It is necessary only

RUDOLF BASS

HIGH QUALITY - LOW IN PRICE

SIMONDS

New SI-CLONE SAWS

SCIENTIFICALLY HEAT TREATED • ACCURATELY GROUND
CUTS STRAIGHT • FAST • SMOOTH — STAYS SHARP

This complete new line of circular saws UP TO 12" in diameter, will give long, satisfactory service, excellent performance and the most value for the least cost. For use on all makes of table, bench, swing, radial arm and portable electric hand saw machines.

TYPE OF SAW	SIZE	PRICE
Cut-off	6"	$1.75
Rip	7"	2.00
Combination	8"	2.15
51, 54, 60	10"	3.15
Easy Cut	12"	4.35

TYPE OF SAW	SIZE	PRICE
Hollow	6"	$2.75
Ground	8"	3.95
Planer	10"	7.45
	12"	9.95

ALL SAWS SHIPPED POSTPAID EXCEPT C.O.D. ORDERS. SPECIFY BORE WHEN ORDERING. OR IF PORTABLE ELECTRIC SPECIFY MAKE AND MODEL. SEND FOR LITERATURE.

Each saw is individually packaged, in factory-perfect condition, ready for use.

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Heston and Anderson announce fastest Cut-off Saw on the Market!*
The answer to top-speed production for your plant or work shop.

Cuts Wood, Metal or Plastic!

An exclusive new automatic air unit makes possible the super speed of the Heston & Anderson Swing Saw. May be used with wood, metal or plastic. Compact and sturdy, its superb construction insures accuracy with every cutting. Easy to operate! Here is truly the finest equipment for your plant or workshop.

Write Today!

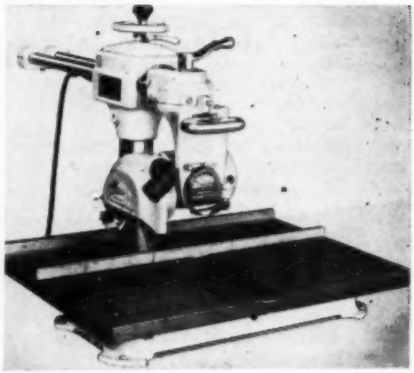
Write for FREE literature . . . name of nearest authorized dealer.
*Thirty-three wood cuttings per minute during routine plant tests.

HESTON & ANDERSON
Division of St. Paul Foundry and Mfg. Co.
11-1A FAIRFIELD, IOWA

to press the foot control valve (which is located a safe distance to the left of the saw travel to prevent accidents), hold until the desired cut has been made, then release—the two-way action of the air cylinder immediately returns the saw to the idle position. The air feed cylinder is quickly detached by removing one stud, placing the machine in manual operation.

COMET CUB REDESIGNED

Consolidated Machinery and Supply Company, 2029 Santa Fe Ave., Los Angeles 21, Calif., has changed the design of the "Comet Cub," their lightweight, multi-purpose radial arm saw. This change widens the work table by 8", increasing the rip capacity of the machine to 24", and allowing the user to rip to the center of panels up to four feet wide. In addition, the table has been bored out so the machine may be used as a shaper without any additional



attachments. A redesigned shaper fence, to fit the new wide table, is provided as an accessory, but a home-made fence, fastened by "C" clamps, will also serve.

This redesigning of the "Comet Cub" was completed because of the wishes of many commercial users of the machine, A. C. Johnson, president of Consolidated said.

"Cabinet makers, working in hard and soft woods, as well as contractors and builders, asked us for more rip capacity and quicker-change-over to shaping. The new design provides both these features," Johnson stated.

The "Comet Cub" is a basic radial arm saw that operates at 7,000 r.p.m. to produce a smooth finish cut. The ¾ h.p. motor is double ended and provides a 12,500 r.p.m. shaft for shaping or similar high-speed operations.

COLOR MAGIC WITH WELDEX

The U. S. Plywood Corporation, 55 West 44th St., New York City, has developed a two-color spray finishing technique for use on Weldex, the striated plywood panel. The new finish for Weldex actually causes the panels to change color, depending upon the position of the viewer.

The special dual color treatment, possible because of the unique striations of the panel, can be created by first spray-

ing the entire panel with a desired color. After the first color is dry, a second color is sprayed at right angles to the direction of the grooves, and at about a 30° angle with the plane of the panel.

Using this method, the second color strikes only one side of the grooves or striations and creates a surprising dual color effect. Detailed instructions are available from the company.

SANDING EQUIPMENT

The Hickory Hill Manufacturing Co., 1640 Maple Ave., Evanston, Ill., is offering a number of items helpful in sanding wood products. The firm offers air drums made of solid aluminum, precision machined and balanced. These drums are for mass production on irregular sanding. They can be attached to motors with ⅝" shaft drive, 1,750 r.p.m., on long belts with idlers, we are told.

In addition to the drums, this firm offers a pneumatic sander—sturdily built, smooth running, equipped with heavy duty oil-light pillow blocks. It weighs 65 lbs., has a four speed belt drive and ⅝" x 30" long shaft. The unit comes complete with 2" diam. and 4" diam. x 7" long drums, 12—0/ and 2/0 abrasive cloth sleeves, 6 for each size drum, hand pump, ½ h.p. motor.

"I think" is the most exaggerated and overworked expression in the English language.

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UNIT TYPE — 300 to 3600 cfm
LOW COST — ¼ hp to 5 hp

AVAILABLE FROM STOCK

For: Grinders, buffers, polishers, woodworking, lint . . . All Dusts.

Send for Cat. 605a; describe problem.

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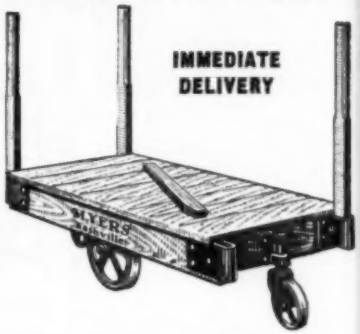
MYERS "TOUGH BUILT" TRUCKS



Capacities: 1500 to 5000 lbs.
Platform Sizes: 21 x 42" to 36 x 72"

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Woodworkers - Fabricators
• Fast - Positive - Lightweight • Tough Aluminum Alloy Jaws
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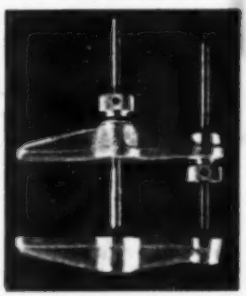
Grips The Work Straight - Like A Vise - Without Side Slipping
One of the most efficient clamps ever devised for Strength, Holding Power, Capacity, Quick and Easy Operation. Try them, you'll want more—low price. **$3.50** per clamp
Dealers Desired



C. B. TEETER— *Tool Room Specialties*
4470 Oakenwald Ave. Chicago 15, Ill.

Mechanics Through the Ages

THE BEARINGS of MACHINES USED BY THE JOURNEYMEN GRINDERS OF EARLY SHEFFIELD, ENGLAND, FREQUENTLY WERE MADE OF GREEN UNSEASONED THORNWOOD, OR GREEN OAK, SOAKED IN BOILING OIL. SOME PREFERRED BROWN PAPER, LAMINATED PIECE ON PIECE.

ALTHOUGH THE BLACKSMITHS OF MEDIAEVAL ROME WERE FORBIDDEN TO MAKE NEW HORSESHOES ON CERTAIN RELIGIOUS HOLIDAYS, THEY WERE ALLOWED TO FIT SHOES ALREADY MADE UP TO HORSES.

IT WAS THE CUSTOM AMONG 17TH CENTURY ENGLISH PRINT SHOPS FOR THE MASTER PRINTER, ONCE A YEAR, TO STAGE A BANQUET FOR SHOP WORKMEN AND TO INVITE TO THIS FUNCTION, THE JOINER, SMITH, INK MAKER AND OTHER SUPPLIERS OF SERVICES. . . . ALTHOUGH THEY WERE GUESTS, THESE CRAFTSMEN WERE SUPPOSED TO "KICK IN" CONTRIBUTIONS TO THE FEAST AND TO THE GENERAL FUNDS OF THE JOURNEYMEN PRINTERS.

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Together, they produce rapidly and at low cost the various shapes for furniture, moldings, copings, cabinet-work, sash and paneling that add smart finishing to woodwork.

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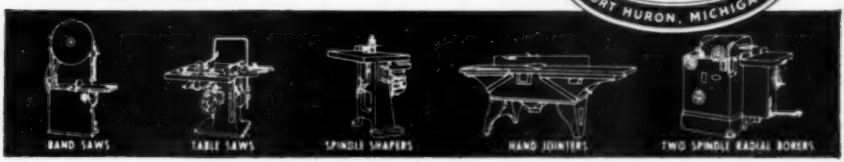

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If you will list below the wood-working machines, supplies or machine shop equipment in which you are interested and mail this page to us, we shall be glad to refer your needs to the manufacturers or others in position to serve you. Replies will come from them — not from us.

If you have any special shop problems let us have the details. Often we can make helpful suggestions.

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DISPLAY ADVERTISEMENTS: 1 inch (Minimum), $8.50; 2 inches $17.00; 3 inches (Maximum), $25.00.

Write directly to those offering the machine for sale, for prices and full descriptions. If what you seek is not advertised, write Hitchcock Publishing Company, 222 E. Willow Ave., Wheaton, Ill., making known your wants on either new or used machinery and the publisher will gladly assist you.

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Moulder, 6" Vonnegut 4-head, with hopper.
Planer, 30" Fay-Egan No. 750 sgl. cabinet, m.d.
Sander, 42" Smith No. 401-C endless bed, m.d.
Belt sander, 6' Mattison No. 124 auto. stroke.
Belt sander, Pearson edge moulding, 99% new.
Woodworker, Sidney universal, five machines.

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Saw Dust and Shavings Mill Exhausters and Blowers—Hundreds in stock, sizes to suit any need. Also Air Compressors, Fans, Rotary Blowers, Money Savers—Send specifications.
All machines rebuilt and fully guaranteed.

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Jointer, Cordesman 8 in. rd. head, $100
Lathe, Waymouth automatic variety, $250
Mortiser, New MD ver. light, HC, $100
Planer, Indiana 18 in. Pony, $300
Ripsaw, American Gang self feed, $300
Sander, C. M. Co. two spindle vertical $100
Sander, Wysong and Miles No. 171 belt, MD, $350
Saw, Var., Roll table, tilt arbor, $300
Saw, variety, American tilt. table, $175
Shaper, Whitney MD. B.B. dbl. spdle., $385
Tenoner, Fay with two copes, $250
Veneer Press, Francis 30 in. x 8 ft., $300
Wood worker, B & M 8 in. Universal, $225

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Air Compressors, various sizes
Air Compressor, Gardner Denver 10x10 Twin dmd.
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Band Saw, Amer. 36" pb. bd. & motor
Band Saw, New Crescent 20" bb. dmd.
Band Saw, New Moak 36" bb. dmd.
Band Saw, Crescent 36" bb vee-belt drive & motor
Blowers, Sturtevant No. 70 & 48"
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Borer, W&M No. 283B Single Spindle Vertical, dmd.
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Frequency changers, 25 KW dmd.
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Jointer, Amer. 12" bb. dmd.
Jointers, New Moak 12", bb. dmd.
Lathe, Yates No. 74 bb. dmd.
Mortiser, Sidney, single spindle pb. bd.
Mortiser, Greenlee No. 228 Vert. bd. & motor
Mortiser, W&M No. 288—5 spdle. Horiz. dmd
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Moulders, Yates-Amer. C-55—9" bb. dmd.
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Planers, New Crescent 24" bb. dmd.
Planers, Holmes, 24" rd. head, pb. bd. & motor
Planer, Whitney 30" Single rd. hd. bb. dmd.
Planer, F & E No. 156 36x7 DMD rd. head
Planer-Matcher, Yates A1-15"x6" rd. hds. pb. bd.
Planer & Matcher, Newman 500-bb. bd.
Redrier, Merritt 12 plate 36x72
Resaw, Connell & Dengler Circular pd. bd.
Router, Defiance, 2 spindle bb. dmd.
Routers, Carter, floor type, Hvy. duty, electric
Router, Yates-Amer. U9 bb. dmd., High Speed
Saddle Seat, McKnight 1B pb. bd.
Sander, Berlin, 31" 3 drum, roll feed bd.
Sander, Mattison No. 134, pb. bd.
Sanders, Mattison No. 138, hand block bb. dmd.
Sander, New Jefferson, hand block, bb. dmd.
Sanders, Niagara Brush, bb. dmd.
Sander, Smith 49" 3-drum endless bed, bd.
Sander, 48" double disc, dmd.
Sander, W&M No. 171 Hand Block, pb. bd. & Mtr.
Sander, Yates 213, 49" 2 drum endless bed, dmd.
Sanders, F & E 60" 3 drum roll feed, dmd.
Sanders, McKnight sgl. drum 24"x16" dmd.
Sander, Oakley Model G2, bb. dmd. hd. block
Sander, Oakley H2, edge belt. bb. dmd.
Sander, Porter Cable vert. osc. dmd. Sgl. Spdle.
Sander, Yates No. 431, 43" endless bed, dmd.
Saw, Beach double cutoff
Saw, Beach swing cutoff, bb. dmd.
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Saws, Jenkins 105A dbl. cutoff bb. dmd.
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Woods 9" 4-side B.D.
X-L Moldmatchers, 4" & 6" Electric

MORTISERS
Greenlee No. 228 Vertical, motor
Greenlee horizontal, foot feed
Northfield, vertical, foot feed

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CARTER GUIDE LIGHT
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Tilting arbors, 5 & 7½ h.p.
Tilting Table, W & W/O Borer
Saw & Dado, foot treadle
Radial Arm, 2—3—5 H.P.
Henry 48" wide Radial Arm, 5 h.p.
Double End, 6' 6", with double end arbors

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Sinker Davis, self-feed
Mattison No. 202 St. Edge D.M.D. prac. new
Several Hand Feed Saws

SHAPERS
Northfield, single Hi-speed D.M.D.
Amer. Sgle. Spindle, heavy duty
Double Spindle—various makes

TENONERS
Single End—Copes & Cut-off

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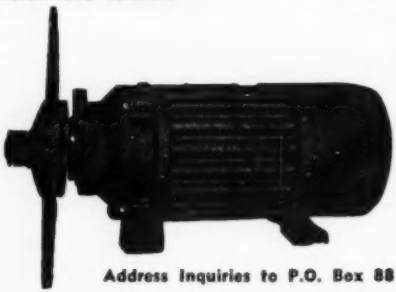

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Solem SE7-4 Four Drum Sander.
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McKnight No. 1-E Saddle Seat Machine.
Whitney No. 365 Automatic Dbl. Spindle Shaper.
Wilkin-Challoner 120 x 72 D.E. Tenoner, jump dado.
Mattison No. 229—8" Electric Moulder, 25 KVA Freq. Changer.

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Bell No. 24 Sawing, Boring, Chucking

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Bell Sauce "E" Air Clamps (3)
Handy Revolving Case Clamps (2)
Billstrom 39 sec. 8' 6" Carriers

Dovetailers
Wysong & Miles 600-601 Air Oper.

Mortisers
Greenlee No. 227 BB MD.

Moulders
Mattison No. 229-8" Electric, lag bed fd., 25 KVA Freq. Changer.
Yates No. C-4-A-8" 20 hp motor

Planers
Whitney No. 32-30" Single BB MD.
Whitney No. 24-A—36" Double BB MD.

Routers
Ekstrom, Carlson No. 232 Routers
Ekstrom, Carlson No. 327 Routers

Routers-Shaper
Ekstrom, Carlson Combination 2 h.p. Disc drive.

Sanders-Drum
Solem SE7-49" Four Drum BB MD.
Yates-American No. 433-49" Three Drum BB MD.

Sanders-Belt
Mattison 138-B Hand Block MD.
Mattison No. 124—6' Stroke.
Wysong & Miles No. 171 MD.
Beach Hand Block MD.

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Ripsaws
Mattison No. 202 Ripsaws (3)

Variety Saws
Tannewitz Type J Tilting Arbor
Tannewitz Type F Tilting Table

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Buss Double Spindle MD.
Whitney No. 365 Double Automatic

Tenoners
Greenlee No. 545—78x60 D. E. Tenoner
Wilkin Challoner 120x72 D. E. Tenoner
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Lathes
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Wallace chisel mortiser, motor driven

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S.A. Woods 701 all electric DMD 12"x4"
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SEPTEMBER, 1952

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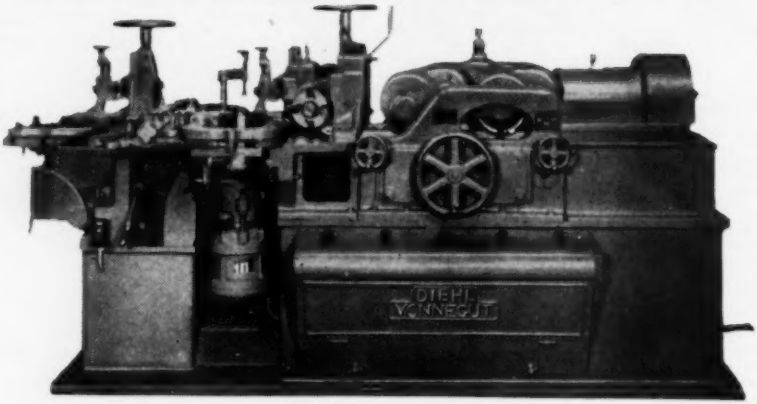

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Yates-American B11-6" B.B. direct M.D.

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Yates-American T5 Auto. Shaping, M.D.
Mattison No. 214 copying lathe
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New Britain No. 2 Chain, with motor
Northfield hydraulic chain, motor dr.
Greenlee No. 227 hollow-chisel, belt drive

MOULDER
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Yates No. 108, 10" belt drive coupled motor
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Fay & Egan 30" 3-drum roll feed
Mattison No. 124, 6-ft. auto. stroke, M.D.
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Yates No. 431, 43-in., 3-drum end-bed, M.D.

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Whitney No. 77 tilting arbor, direct M.D.
Dodds tilting-table, V-belt, motor drive

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DeWalt Radial Arm, 5 HP motor
Greenlee No. 451 auto., cut-off and dado
Buss double cabinet type, motor drive
Porter 43-20S 30" stroke, motor on arbor

RIP SAWS
Newman No. 37A Power feed, motor driven
Yates G-2 Chain Feed, B.B., Mtr. Dr.
Greenlee 426 Roll Feed with motor

TENONERS
Fay & Egan 505 electric with capes
Greenlee No. 534, tilting spindles, dir. M.D.
American single-end with capes, rolling table
Jenkins No. 95 double end, jump dado, D.M.D.

This is only a partial list — send or call your inquiries

1965 E. Milwaukee — Detroit 11, Michigan

Telephone TRinity 2-6442

"If it's for Woodworking . . . We Have It"

BAND SAWS:
20" American S. M. Mchry. Co.
20" Northfield B.B. M.D. (New)
20" Delta New
30" Fay & Egan No. 155
32" Crescent M.D. Vee Dr. (New)
36" Tannewitz 7½ hp. D.M.D.
36" Fay & Egan No. 345 and No. 50
BAND RESAWS:
Yates V-4 54" L.H. Vert. M.D.
Fisher 40" Vertical
Connell & Dengler 60" $1500.
BORING MACHINES:
American—Clement 2 spindle Hor. Radial Bore
Andrews 72" Ball Br. Vert. Power Feed 8 Spdl.
Fay & Egan No. 312 Vert. 48" cap. 6 Spdl.
Fay & Egan Vert., 6 spindle Borer, 36" Capacity
Root Sgl. Spindle Motor on Spdl.
BOX MAKERS MACHINERY:
Hall & Brown Box Board Matcher
Tidey Box Makers Rip Saw
Doig 18 track C.B. Cleater
Doig 3 track C.B. Nailer
CLAMPING MACHINES:
Handy No. 79 Case Clamp
Lancaster Pneumatic Chair Clamp prac. new ½ price
Laidlaw 3¼"x8 Door Clamp $250.
CUT OFF SAWS:
Comet T-C-16 10 hp. 44" blade
Greenlee No. 453 C.O. Automatic
DeWalt 5 hp., 3 ph. Radial
DADO SAWS:
American No. 12 Dado MD
Hermance No. 2 Foot Feed
Hall & Brown No. 134 Power Feed
Beach Double Dado and C.O. Saw M.D.
Beach Double End Cut-off Dado Saw
DOVE TAIL:
Dodd 15 spdl. M.D. rebuilt like new
Fay & Egan 15 Spdl. Belt $200
DOWEL MACHINES:
Hawker No. 2
Hawker No. 3
Fay & Egan No. 406 Rod Machine
JIG SAWS:
Oliver No. 173-B B.B. M.D.
Jones Superior No. 46 Self Contained M.D.
Beach No. 1 Ceiling Suspension
JOINTERS:
Crescent 8" H.D. Ball Br. D.M.D.
Crescent 16" Ball Br. Vee Dr.
Crescent 18" Ball Br. Vee Dr.
Fay & Egan No. 61 24" $275
Moak 12" new D.M.D.
Porter No. 300-C 24" Ball Brg. Jointer, 4 knife head with 10 h.p. 3 ph. D.M.D., used less than 3 months
LATHES:
Mattison No. 55—Automatic
MORTISERS:
American Hor. H.C. Auto Feed
Yates-Amer. No. 25K Motor Spindle
Crescent Ball Br. Motor built in
New Britain No. 4 — Chain Mortisers
New Britain No. 7 Chain Mortiser
MOULDERS:
Hermance No. 50—12" Babbitted Bearing
American 6" No. 3 H.D.
Hermance 8" No. 50
Fay & Egan No. 184 12" P.B.
American No. 505 10" P. B.
S. A. Woods No. 132-M 6" Electric Moulder
NAILING MACHINES:
Doig 18 track Cleater M.D.
Doig 3 track C. B. Nailer
Gramme 4 tr. Cigar Box Nailer
PLANERS—DOUBLE:
American No. 4—27"x7" Double
American 26
Berlin No. 175 30"x12"
PLANERS—SINGLE:
American No. 4½ 30" x 7"
American No. 444 30" x 7"
Solem 12"x3" D.M.D.
Sidney 18"x8" P. B. M.D.
American No. 1 20"x6"
Crescent No. 124 24"x6" P. B.
Crescent 26"x8"
American No. 4½—27"x7"
Crescent 26"x8" Var. Feed
American No. 112 24"x8"
Powermatic 12"—16"—20" (New)
RADIAL SAWS:
New Delta Multiplex No. 20A-30A-40A-50A-50C (new)
New Skil Radial Saw, 5 hp., 3 phase
Delta No. 20 A, ½ hp., 1 phase (Used)
Comet—Crib, ¾ hp., 1 phase (New)
Walker Turner 1½ hp., 3 hp., 3 ph.
RIP SAWS:
Hall & Brown Self Feed, Ball Bearing DMD
American No. 2 Power Feed
Yates No. 281 42" Band Rip
Falls St. Line Ball Br. M.D.
Fay & Egan Heavy 10" cap. Hand Feed
L. Power & Co., Self Feed, Belt or Motor
ROUTERS:
Kelley 3 ph. Stair Router
Hunter 1 ph. Stair Router, $50
Duro 1 ph. Floor Type
SANDERS:
Yates No. 401 42" 3 dr. Roll Feed
Amer.-Columbia 42" 3 dr.
Smith 30" 3 dr. Endless Bed Belt Dr.
Mattison No. 115 Variety Belt Sander
Yates-Amer. Comb. 15" Disc and Drum
Beach No. 201 New Belt Sander
American No. 15 24" and 30" Sgl. Drum
Porter Cable Spindle Sander
Fay & Egan No. 225 48" 3 dr.
Fay & Egan No. 225—42", 3 Drum R F
Wysong & Miles No. 257—Belt Sander
SASH MACHINES:
Greenlee No. 604 Sash Relisher
American No. 1 Combination Sash Jointer-Sander
Hermance 5" 4 S Sticker with P & B Attach.
STICKERS:
Hermance No. 3 5" 4 S. P. & B. Attach.
Hayes 2 side Shimer Heads
American 2 side Door Sticker
SHAPERS:
Fay & Egan No. 253 Sgl. Spl. Ball Br.
American Sgl. Ball Br. M.D.
Fay & Egan No. 265 Double spdl.
Anderson Double Motors on spindles
Delta Floor Type
Walker Turner No. S-1140
TENONERS:
Smith Dbl. End with 2 Copes & C. O. Saw Babbitted Bearing, Belt Driven
Egan, Sgl., 2 Copes—$275.00
American No. 1 Sgl. w. copes & C.O. Saw
Fay & Egan No. 2 Single w. copes
TIMBER SIZER:
S. A. Woods No. 8, 16" x 30" Sizer
Yates P-12 20"x12" 4 side M.D.
VENEER CLAMPS—SECTIONAL:
5 — 38" 4 — 28"
VENEER PRESSES:
6—60" sections w. Ratcher Screws
WOODWORKERS:
Crescent No. 58 5 units
Sidney No. 30 5 units

ERVIN MACHINERY CO., INC.
124-26-28 Boulevard of Allies Pittsburgh, Pennsylvania

TOP VALUES

Earle Hart's USED AND REBUILT WOODWORKING MACHINERY

ROCK BOTTOM PRICES

* Indicates Ball-Bearing and Motor Driven

BORERS—Horizontal & Vertical

Towsley two-spindle horiz. radial borer.
* Oliver No. 71—3 spindle horizontal borer.
Greenlee No. 368-30" Mult. Horiz. Borer.
Andrew 48" & 72" Mult. Horiz. Borer.
* Wysong & Miles No. 283-B Vert. Sgl. Spl. Borer.
* Greenlee No. 386 4-ft. Vert. Multiple Borer
* Greenlee No. 369—48" Vert. Mult. Borer.
Andrews 60" multiple vertical borer.

CHAIR MACHINERY

* McKnight double end sawing and boring machine.
McKnight No. 1E saddle seat machine.
Bell No. 8 dowel gluer and driver.
Dauber-Bell dowel cutter and pointer.

CLAMPING MACHINERY

Taylor-Billstrom-Black 12-18-30-40-sec. clamp carr.
Handy No. 447 Air Operated, 2-way End Clamp.
Handy and Union revolving case clamps.

GLUE MIXERS & SPREADERS

Francis M-7 (75 gallons) Veg. Glue Mixer.
Union 36" and 60" Dbl. Roll Resin Glue Spreaders.
Francis 12-in. edge glue spreader.

JOINTERS

* Fay & Egan No. 506—12" hand jointer.
* Yates-American No. 213 glue jointer.
* Jenkins No. 343-A glue jointer.
* Diehl No. 60 glue jointer.

LATHES

* Mattison No. 55 C Auto. Turning Lathe, b.b.
* Yates-American T-5 auto. turning lathe.
Mattison No. 210 copying lathe.

MORTISERS

* Greenlee No. 227 automatic hollow chisel mortiser.
Greenlee No. 228 auto. hollow chisel mortiser.
New Britain Nos. 2 and 7 chain saw mortiser.
* Whitney No. 67 horiz. osc. bit mortiser.

MOULDERS

* Oliver No. 202—4-in. electric moulder.
* Mattison No. 276—6-in. electric moulder.
* Vonnegut 6-in. electric moulder.
* Yates No. 108—10 in. heavy-duty moulder.
Yates C3A-4" belt drive moulder.

PLANERS—Facing

* Whitney No. 32—30" single planer.
* Porter 24" facing planer—Herzog feed.
* Yates-American No. 3—30" facing planer. Herzog feed

PLANERS

* Crescent P-24—24-in. single planer.
* Buss 4-A 30 in. single planer.
* Whitney No. 29—36-in. single planer.
* Greenlee No. 110—30" 6-roll single planer.
* Whitney No. 24—30" and 36" double planer.

ROUTERS

* Ekstrom-Carlson No. 327 heavy duty router.
* Onsrud W-240 heavy duty electric router.
* Porter No. 600 and 610 heavy duty elec. router.

DRUM SANDERS

* Solem SE7-3 42 inch, 3 drum endless bed sander.
* Smith No. 404B—42-in. 3-drum endless bed sander.
Yates No. 421—42" 3-Dr. end. bed mtrzd.
* Solem S 3-M 73" 3-drum endless bed sander.
American No. 9—61" 3-drum roll feed sander, mtrzd.

SANDERS—Belt & Miscellaneous

* Wysong & Miles No. 294 auto. stroke sander.
Curtis No. 8 semi-automatic stroke sander.
Mattison No. 124 auto. stroke sander.
* Wysong & Miles No. 277 hand block belt sander.
Nash No. 10 & No. 25 auto. spindle sanders.
American No. 11 horiz. surface sander.

SAWS—Band Scroll & Resaws

* Tannewitz Type G. 36-in. band scroll saw.
* Superior 36-in. band saw—Carter wheels.
* Fay & Egan No. 56—36" band saw.
* McDonough 44" vertical band resaw.
* Bell 12B double cut-off and miter saw.

SAWS—Cut-Off

* Porter 43-20S straight-line cut-off saw
* Yates-American G-44 straight line cut-off saw
* Monarch 36AF radial arm saw
Smith chain-feed double cut-off saw
* Jenkins No. 105-A dbl. cut-off and mitre
* Bell 12B double cut-off and miter saw

SAWS—Rip

* Diehl No. 75 straight line ripsaw.
* Mattison 205-207 and late model 202 straight line ripsaws.
* Yates-American G-77 straight line ripsaw.
Greenlee No. 426 self feed ripsaw.

SASH & DOOR MACHINES

Bell No. 5-B stile and rail borer.
* Bell No. 11 power door clamp.
Bell No. 7 dowel driver and gluer
Millbury pocket cutter.

VARIETY SAWS

* Tannewitz Type J tilting arbor variety saw.
* Fay & Egan No. 500 tilt-table variety saw.
* Tannewitz tilt-table variety saw, b.b.
* Baker double arbor variety saw, b.b.
* Yates-American No. 8 saw and dado machine.

SHAPERS

* NEW Crescent No. S-2 single spindle shaper.
* Porter No. 103 single spindle shaper.
* Porter No. 201 double spindle shaper.
* Greenlee No. 180 double spindle shaper.
* Whitney No. 351 double spindle, 12½ HP motors.
* Whitney No. 393 automatic, single spindle shaper.
* Onsrud No. 124 automatic single spindle shaper.

TENONERS

Greenlee No. 530 single end tenoner, b.b.
* Wilkin-Challoner No. 70 - 96" double end tenoner
* Jenkins No. 95—96-in. double end tenoner.
Jenkins No. 96 60-in double end tenoner, b.b.
* Greenlee No. 545—90 inch double end tenoner.

VENEER EQUIPMENT

Dennis No. 2 veneer taper.
Francis 36"x84" hyd. veneer presses.
Merritt 84x54—8—10—12 plate redrierş.
Francis 30x80-in. hand screw veneer press.
Large quantity "I" beams and turnbuckles.

MISCELLANEOUS MACHINES

* Hanchett GK 36-in. auto. knife grinder.
Food Machinery Co. Model AC-2 bormaker.
* Woods No. 227 side head grinder.
NEW Hanchett No. 133 auto. band resaw sharpener.

This is only a partial list. If the machine you want is not shown, write us.

STANDARD OF COMPARISON — THE "HART" LINE

Earle Hart WOODWORKING MACHINE COMPANY

565 WEST WASHINGTON BOULEVARD CHICAGO 6, ILL. RAndolph 6-4970

GOOD MACHINES TRUTHFULLY REPRESENTED

Wilkin-Challoner No. 703 Automatic Plow and Bore Machine
Mereen-Johnson 80"x56" DMD BB Double End Tenoner
Jenkins Model EG—96"x40" Belt Drive Double End Tenoner
Hayes 102"x60" Double End Tenoner
Crescent Ball Bearing Electric Single End Tenoner
American No. 1 Single End Tenoner
Mattison No. 55-C—30" Ball Bearing Auto- matic Shaping Lathe
Mattison No. 57-D—42" Ball Bearing Au- tomatic Shaping Lathe
Jenkins No. 65 Ball Bearing Sash and Door Sticker
Vonnegut 6" Ball Bearing Electric Moulder
Jones-Superior No. 35 Two Spindle Horizon- tal Borer
Frank H. Clement Two Spindle Radial Bor- ing Machine
Wysong & Miles No. 283-B Single Spindle Borer
Solem 53-M—49" BB Three Drum Endless Bed Sander
Solem No. 370 - 30" Two Drum Endless Bed Sander
Wysong & Miles No. 171 Hand Block Moulding Sander
Jones-Superior No. 145—30" Disc Sander
Buss Double Cut-Off Saw
Tannewitz 42" Ball Bearing Band Saw
Wilkin-Challoner No. 60—72"x72" Electric Ball Bearing Double End Tenoner
Greenlee No. 110—36" BB, DMD Single Planer
Whitney No. 24—30" BB Double Head Cabinet Planer
Whitney No. 39-A DMD BB Double Spindle Shaper
Buss No. 8 BB Double Spindle Shaper
Mattison No. 244 BB Cut-Off Saw
Billstrom 7' 29 Section Clamp Carrier
Taylor 19 Section Revolving Clamp Carrier

O'LEARY & FLYNN

ROOM 1606 — 666 N. LAKE SHORE DRIVE — CHICAGO 11, ILLINOIS

GUARANTEED USED MACHINERY

Box Notcher, Mereen-Johnson for beverage cases
Borer Greenlee No. 368—4 Spindle M.D.
Jointers, Delta 8" Sidney 16", M.D.
Lock Corner Cutter, Morgan, with cutters, single end
Mortiser, Hollow Chisel, Hall & Brown No. 208, M.D.
Moulder, Yates No. C-3—4"-4 side
Nailer, Morgan 4 track, M.D.
Nailing Machine, Morgan 9 track, open back
Planers, single, Fay & Egan 24x6"
Thickness Planer, New Delta 13x5"
Planer single American 30x8" Belt Drive
Planers 12x4" Parks 13x6 Barton 10" Red Fox
Planer, Double, Whitney 30x7"—8 roll, 4 knife round cylinder, 40 H.P., top head, 25 bottom head, 3 H.P. feed, sectional roll and chipbreaker, babbitt bearing.
Planer & Matcher, Hall & Brown No. 209, 15x6" Double Profiler
New Powermatic 16x6", Delta 13x5", Powermatic 12"x4", all motor driven
Router Yates-American U-900—1½ HP motor
Router, Onsrud No. W-240—7½ HP, 2 speeds
Saddle Seat Machine McKnight
Sander, Nash No. 87-20"—4 spindle, M.D.
Sander, 49"—3 drum, roll feed Fay & Egan No. 225, M.D.
Sander, belt, hand block, Mattison & Fay & Egan
Sander, Belt, Auto. Stroke, Curtis 6'
Band Saws, Union 20", M.D., New Delta 20", M.D.
Band Saw Tannewitz No. CI-36"—30" underguide, M.D.
Band Resaw 54" Mershon Standard with 35 HP motor
Chain Feed Rip Saw Yates-American No. 67-15 HP Motor
Rip Saw XL Roll Feed 10 HP motor
Beach 6 & 8 ft. Carriage Cut-Off Saw
Radial Saw, Wilson 5 H.P. 3/60
Radial Saw, New Delta No. 50-C—5 H.P.
Rip Saw, Beach, Wood Frame, motor driven
Delta 12" Tilting Arbor Saw, 5 HP motor, New
Darra-James 12" tilt Arbor Saw, New & Used
Swing Saw Eaglesfield motor drive
Shaper, single spindle Fay & Egan, 5 H.P. motor
Delta and Boice-Crane Shapers, 3 phase motors
Shaper DBL. Spindle Whitney with Frequency Changer.
Tenoner, single end, American No. 2½, Hall & Brown No. 55
Tenoner, double end, Wilkins-Challoner 120" with copes and cut-off saw, with motor
Veneer Press Francis 24"x96"—15 screws

Send us your inquiries for any machines not listed.

McDONALD MACHINERY CO.

1535 N. BROADWAY — CE. 9360 — ST. LOUIS 6, MO.

FIELDBUILT AND USED MACHINERY

* Indicates Ball Bearing

BAND SAWS:
*Tannewitz 30" and 36" M.D.
*Fay & Egan 42" Rip & Resaw, M.D.
Berlin 44" Band Rip, M.D.

BORERS:
*Root GM with 3 Spindle Head, M.D.
Root C—8 Spindle, M.D.
Root BM—15 Spindle, M.D.
*Root D-150 Horizontal 2-Spindle, M.D.

CLAMP CARRIERS:
Taylor 40 Section, 7½" width
Taylor 40 Section, 6½" width

DOVETAILER:
Dodds 10 Spindle Furniture

DOWEL SANDER:
Nash No. 6 for stock ⅜" to 2½" diameter

JOINTERS:
*Oliver 16" M.D.
*L. Power 16" M.D.
*Porter 20", M.D.
*Diehl Glue Jointer (550), M.D.

LATHES:
*Imperial Automatic, M.D.
Mattison No. 57-B Automatic

MOULDERS:
*Mattison 6" No. 276 Electric Moulder
Hermance 8" 4-side Moulder

PLANERS:
*Whitney 24" Double, M.D.
*Buss 26" Single

ROUTERS:
*Porter 622, M.D.
*Onsrud W-240 (550 volt)

SANDERS:
*Fay & Egan 30" End, Bed, 2-drum
Yates 30" End, Bed, 3-drum
*Wysong & Miles 171—(550 V)
*Wysong & Miles 291 Panel, M.D.
*Schipper 8 Spindle Automatic Turning, M.D.
*Nash 10 Spindle Automatic Turning, M.D.

SAWS:
*Tannewitz J.S. Tilting Arbor, M.D.
*Tannewitz B.S. Double Arbor Tilting, M.D.
*Tannewitz Combi. Saw-Jointer, M.D.
*Tannewitz U—Tilting Arbor, M.D.
*Greenlee Tilting Arbor, M.D.
*Mersen-Johnson Double Cut-Off, M.D.

RIP SAWS:
*Diehl 73, M.D.
*Greenlee No. 426, M.D.

SHAPERS:
*Buss No. 8 Double Spindle, M.D.
*Onsrud W-125 Automatic, M.D.

TENONERS:
*Greenlee No. 535 Saw Tenoner, M.D.
*C.K.L. No. 720 Double End, M.D.

VENEER EQUIPMENT:
*Diehl 89 Splicer, M.D.
*Diehl 69 Veneer Jointer, M.D.

MISCELLANEOUS:
*McKnight Dbl. End Borer & Cut-Off Saw 550 V

WILLIAM H. FIELD COMPANY

SINCE 1880

327 Dorchester Avenue **Boston 27, Massachusetts**

GUARANTEED BY GAYNES

AIR COMPRESSORS
New and Rebuilt, all sizes
Quincy 3/4 HP single stage, tank mounted
Chicago Pneu. 9 x 8 Horiz., 173 C.F.M. with tank, M. D.

BORERS
Yates-Am. No. 1 Sgl. Spdl., Horiz., B.B., D. M. D.
2-spindle Radial, 1-10", 1-18", cap., Motorized

CLAMPS & CLAMP CARRIERS
American 54" x 96" Door Clamp
Taylor 8-section, 7'6" cap. Clamp Carrier
Taylor 40-section 7" cap. Clamp Carrier
Billstrom 39-sec. 6'6" cap. Clamp Carrier, Power Drive

JOINTERS
Union 6", B.B., D. M. D.
Northfield 8", B.B., D.M.D.
Tewsley 10", B.B., D.M.D.
Jenkins No. 343A Glue Jointer, B.B., D.M.D.
Porter 24", B.B., Facer with Herzog 4-post Feeder, M.D.

MORTISERS
Loeffler No. 609, Motor Driven
Sidney Hollow Chisel, B.B., D.M.D.
Greenlee No. 227 Hollow Chisel, B.B., D.M.D.
New Britain No. 2 Chain, M.D.

MOULDER
Woods No. 144M, 6" 2 hd., all elec., B.B., D.M.D.

PLANERS
Yates No. 156-30" Single Cabinet, B.B., D.M.D.
Whitney 36" Single Cabinet, B.B., D.M.D.

ROUTERS
Ekstrom-Carlson No. 232, B.B., M.D.
Ekstrom-Carlson No. 327, B.B., M.D.
Onsrud No. 240-D, B.B., M.D.

SANDERS
Solem S3M 42" 3-drum End. Bed., B.B., D.M.D.
Smith 42" 3-drum End. Bed., B.B., D.M.D.
American No. 9, 3-drum, 61" Roll Feed, D.M.D.
Mattison No. 124, 6" Auto. Stroke, M.D.
Mattison No. 138B Hand Block, B.B., M.D.
Jones-Superior 48" Double Disc, M.D.
Ecco No. 111 Edge Belt Sander, B.B., D.M.D.

SAWS
American No. 110, 54" Band Resaw, B.B. D.M.D.
Porter C-43 Cut-off Saw, B.B., D.M.D.
Diehl No. 75 Chain Feed Rip Saw, B.B., D.M.D.
Mattison No. 207 Chain Feed Rip Saw, B.B., D.M.D.
Bell No. 12C Double Mitre Saw, B.B., D.M.D.
Tannewitz Type J, Tilting Arbor B.B., D.M.D.
Nash No. 4 Double Cut-off & Chuck, B.B., M.D.
Bell No. 16, B.B., M.D. (new)
H & A No. 55 Swing Saw, B.B., M.D.

SHAPERS
Crescent No. S-2 and No. S-5 Single Spindle, B.B., motorized
Sidney 2-spindle, B.B., motorized
Porter Buck Shaper, B.B., M.D.

TENONERS
Jenkins No. 95, 48" x 90" Double End, with upper scoring saws, B.B., D.M.D.
Fay & Egan No. 401B Double End, Crate, M.D.

MISCELLANEOUS
Morgan 16-track Nailer, open back, with clincher
Mattison No. 55C Automatic Lathe, B.B., M.D.
Jenkins Three-in-One Machine, M.D.

GAYNES ENGINEERING COMPANY

1642 W. FULTON ST. **PHONE: HAymarket 1-5257 - 5258** **CHICAGO 12, ILLINOIS**

REBUILT AND USED MACHINES

BAND SAWS
Colladay, 36", Motor Driven
Crescent 38", cast iron wheels
BORERS
Root "GM" Vertical Single Sp.
Amer. No. I, 2-Sp. Horiz. Radial
Keystone 3-Sp. Horiz. 1" centers
CARVERS
Minnesota 16-Sp. Multiple Carver
Gallmeyer & Livingston Single Sp.
CLAMP CARRIERS
Taylor 7½' 30-Sec. Chain Type
Taylor 7½' 40-Sec. Chain Type
DOVETAILER
Dodds 12-Spindle, spiral gear
GLUING MACHINES
Bell 72" Plate Edge Gluer
Black 5-Gal. Portable Resin Mixer
Black 30-Gal. Cold Resin Mixer
Black 26" Double Resin Spreader
Black 50" & 56" Dbl. Resin Spreaders
JOINTERS
6", 16", and 20" Sizes
30" with Billstrom Feeding Attach.
Yates Continuous Feed Glue Jointer
LATHES
Mattison No. 57-D 42" Auto. Turning, M.D.
Imperial Auto. Turning, D.M.D.
MORTISER
Fay & Egan No. 462 P.F. Hollow Chisel
MOULDERS
Smithway "XL" 4" Ball Bearing
Hermance 6" 4-Side
4" & 6" Single Head Stickers

PLANERS
American No. 444, 24" Single, M.D.
Yates No. 152, 24" Single, M.D.
Buss 30" & 36" Single, M.D.
Whitney 30" Dbl., 8 feed rolls
ROUTERS
Onsrud W-240 High Sp. Electric
SANDERS
Nash No. 65 Automatic Turning
Yates No. 431, 43" 3-Dr. Endless Bed
Wysong & Miles No. 173 Univ. Belt
Curtis No. 11 Semi-Auto. Belt Sander
SAWS—CUT-OFF
Porter Floor Type, with Table
Y-A- C-44 Floor Type, with Table
Root No. 248 Double, 32"x82"
Bell No. 12 Double Miter
Beach No. 3 Double Cut-Off
SAWS—SELF-FEED
Hermance No. 31 Adjustable Roll
Greenlee No. 426-Root-American
SAW TABLES
Tannewitz SJ Tilting Arbor
American Dbl. Revol. Arbor
American No. 7½ Comb. & Dado
SHAPERS
Onsrud WA-50 Automatic
Porter No. 200 SVM Single, M.D.
American No. 1 Single Reversible
Whitney No. 8 Dbl., Ball Bearing
TENONERS
Power Single End, Motor Driven
Colladay, Fay & Egan, American
VENEER JOINTER
Jenkins No. 23 DMD, Ball Bearing

B. M. ROOT CO., YORK, PA.

CHEAP for QUICK REMOVAL

Our local customer, having sold their real estate, must dispose of their equipment at once. Each machine is in good working condition and complete with three phase motor, starter and the usual accessories now with each. They are as follows: American 'Columbia' 43" 3-drum Roll Feed Sander-each drum D.M.D.; Yates G-2 Straight Line Rip Saw-10 h.p. D.M.D.; Hoosier Self-Feed Rip Saw; F & E 26" Single Cylinder Cabinet Planer; Hermance 10" Moulder with 12" top head; 8" and 10" Universal Woodworker; Phillips Complete Window Frame Machine; Greenlee No. 227 H.C. Vertical Mortiser; Moak Hi-Speed S.S. Shaper; Beach Roller Table Cut-off Saw; Tannewitz D.M.D. Tilting Table Universal Saw; 36" Band Saw; Single End Tenoner with T & B Copes; Sash Sticker, single head. These will be offered at extremely low prices for quick sale and complete with whatever equipment that may be with each machine.

THE OSBORNE & SEXTON MACHINERY CO.

P.O. BOX 88 COLUMBUS 16, OHIO

HARDBOARD PANELS

Hardboard panels have been produced with tongue-and-groove edges for the first time, making it possible now to put together hardboard walls and ceilings without cracks that have to be filled in or masked. This news comes to us from the Forest Fibre Products Co., Forest Grove, Oregon.

GUIDE TO WORLD'S RESEARCH IN WOOD

More than 17,000 research projects on wood and other forest products, conducted by nearly 3,000 domestic and foreign organizations, firms and agencies, are catalogued in the new fifth edition of the "Forest Products Research Guide." The book is being issued by the National Lumber Manufacturers Association.

The material, filling almost 400 pages, was compiled by the N.L.M.A. staff in cooperation with that of Timber Engineering Company's research laboratory.

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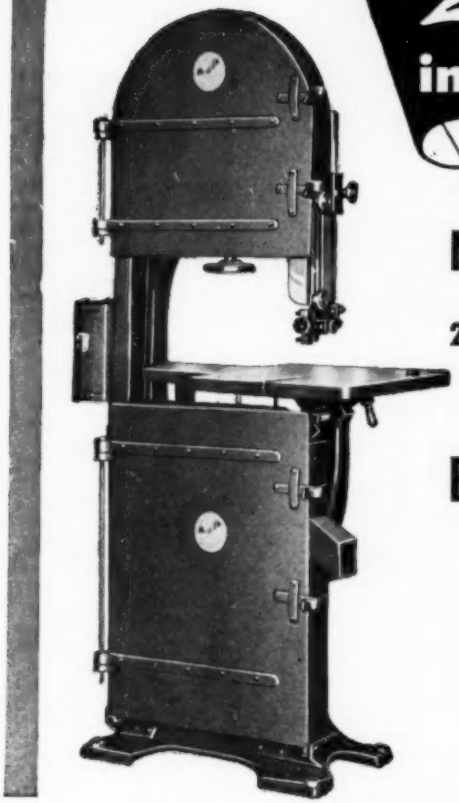

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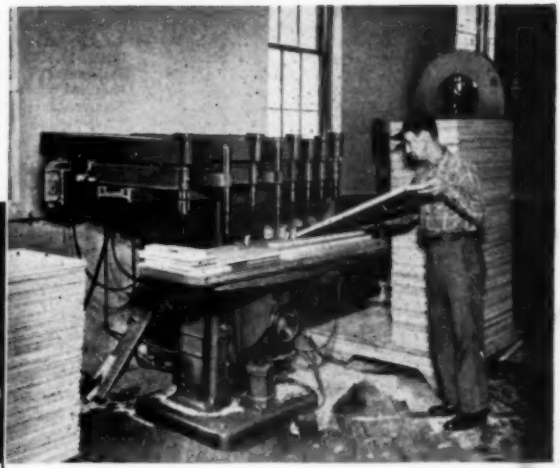

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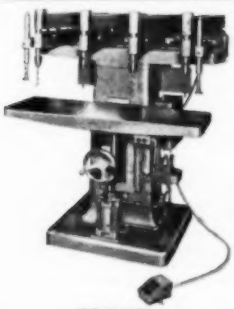

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Spindle RPM	3600
Work Table Size	16" x 48"
Minimum Center Distance between Spindles	2-1/2"
Spindle Chuck Capacity	0" to 1/2"
Maximum Clearance between Table and Chuck	10"
Adjustment of Spindle Arms (Front to Back)	14-3/8"
Vertical Knee Adjustment	6"
Maximum Table Stroke	4"
Adjustable Table Dwell (Loading Position)	3/10 to 60 seconds

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1411 RAILROAD AVENUE, ROCKFORD, ILLINOIS

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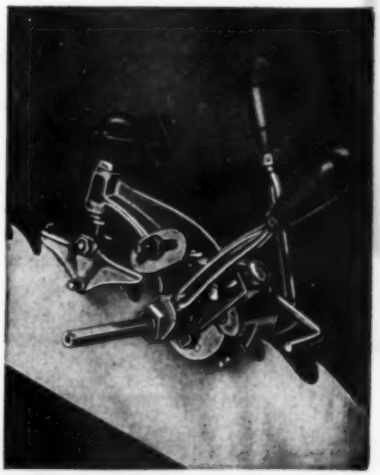
No. 36 BAND SAW SWAGE

No. 10 Band Swage Shaper



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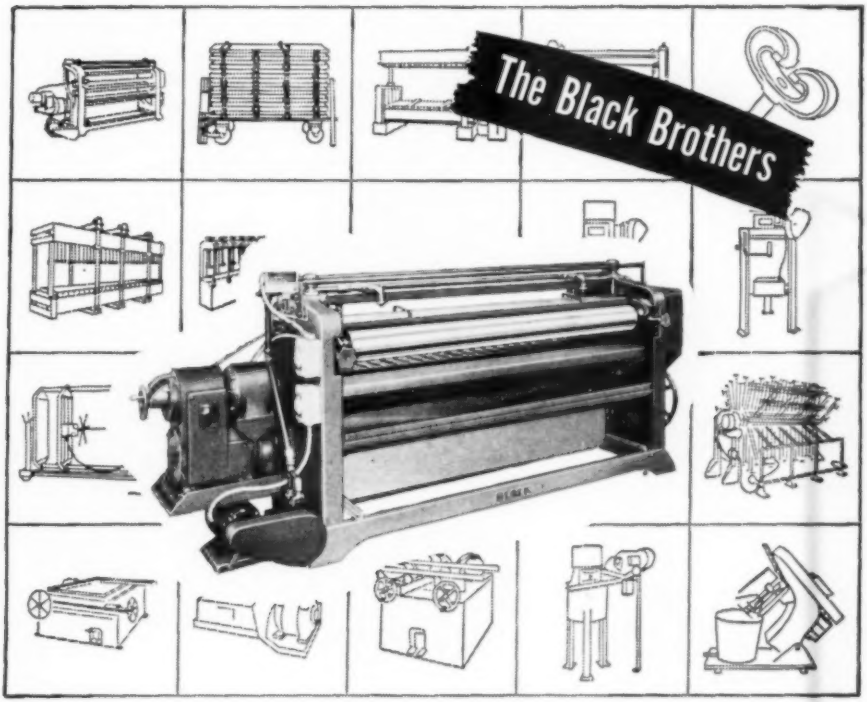

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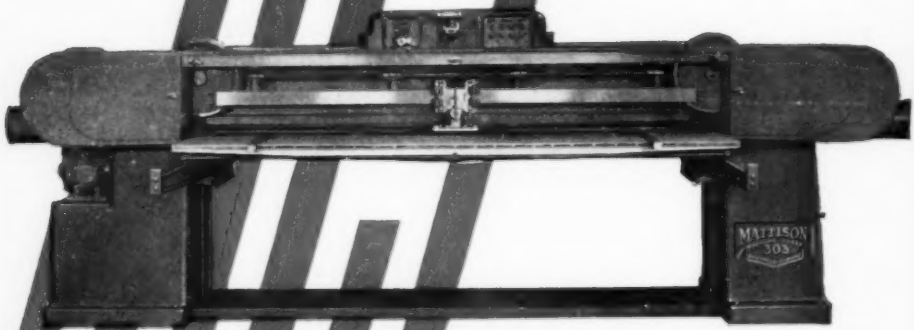

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